KITKAHAHKI CHIPPED STONE TECHNOLOGIES: A COMPARATIVE STUDY

BY

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ABSTRACT

The decades around 1800 A.D. witnessed dramatic changes in material culture and technology among Central Plains tribes. About this time, the rapidity of change in and transition from traditional chipped stone technologies was unprecedented in the preceding human occupation on the Plains. Chipped stone assemblages were being rapidly replaced and changing in character and function. This transition was in large part accelerated by the introduction and incorporation of European trade items into tool kits, and the increasingly pervasive influence of new technologies on traditional life-ways. Here I consider the chipped stone material from two Kitkahahki Pawnee sites, 14RP1 in Republic County, Kansas, and the Hill site (25WT1) in Webster County, Nebraska. Stone sources and artifact types are reviewed and limitations of current samples are noted. Research at 14RP1 and the Hill site will help to alleviate these limitations and to characterize the Pawnee's transition away from chipped stone technologies.

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CHAPTER 1
Introduction

The decades around A.D. 1800 witnessed dramatic changes in material culture and technology among Central Plains tribes. During this time, the rapidity of change in and transition from traditional chipped stone technologies was unprecedented in the preceding human occupation on the Plains. This transition was in large part accelerated by the introduction and incorporation of European trade items into tool kits and the increasingly pervasive influence of new technologies on traditional life-ways. Within a short time after contact, chipped stone acquisition and use shifted from playing a primary role in everyday Native American life to being virtually replaced by introduced European trade goods.

The chipped stone industries of the Kitkahahki Pawnee will act as the focus assemblage for this study. An analysis of chipped stone artifacts from two Kitkahahki sites, 14RP1 in Republic County, Kansas, and 25WT1 in Webster County, Nebraska provides a foundation for comparisons of Pawnee chipped stone technologies from the 1770s to the 1820s with those from earlier and later sites. However, this project is primarily an inductive pattern study for these two sites, and comparisons to other sites are limited.

This project began as an attempt to document noticeable changes in chipped stone technology in the Central Plains from approximately A.D. 1200 to A.D. 1800. I planned to summarize the replacement of traditional chipped stone technologies with introduced European metal objects through time, and ultimately develop a time scale for the rate of replacement for different artifacts. Many collections from sites outside of protohistoric and historic Pawnee sites were recognized as potential candidates for inclusion in this report. However, after analyzing the collections from 14RP1 and 25WT1, it became increasingly clear that different factors were

influencing the collections and that change was not a universal phenomenon I could map for a spatially defined region without first understanding the factors influencing each individual site.

The diversity between these two assemblages was not initially expected, and this project quickly acquired a new direction. Most attempts at making comparisons to earlier and later sites were dropped, and focus shifted to documenting and interpreting the differences between these two assemblages. In effect, the project became driven by the research and not guided by a specific problem statement or set of hypotheses. These developed as work progressed, and centered on attempts to refine chronological assessments of 14RP1 and 25WT1 using chipped stone materials, while at the same time providing intra-site comparisons of material type and tool form among specific lodges when possible. Specific questions emerged, including: what chipped stone materials are being used? How and why are lithic material types changing through time? How does chipped stone material type and tool form vary among lodges and between the two sites? What metal trade objects are present and how do their distributions among lodges and between the two sites influence or correspond with chipped stone distributions?

To answer these questions, select tools were targeted, including scrapers, knives, drills, awls, projectile points, gunflints, and strike-a-light flints, with similarities, differences, and frequencies of those tool forms recorded for each site. This project should provide a foundation for further research into documenting traceable changes in chipped stone assemblages beyond the Kitkahahki focus group, and aid in characterizing the Pawnee's transition away from chipped stone technologies.

Chapter 2 provides a brief introduction to the history of the Pawnee in general, and outlines the four known Kitkahahki village sites. Both village sites considered in this study have a complex history of investigations which is discussed further in chapter 3. The site 14RP1

materials recovered during Carlyle Smith's 1949 excavations, as well as limited excavations by Floyd Schultz and George Lamb in 1933, are currently housed in the Archaeological Research Center at the University of Kansas. Additional 14RP1 materials were analyzed while on loan from the Kansas State Historical Society, Topeka, and represent the excavations conducted by Thomas Witty, Jr. from 1965 to 1968, as well as the materials recovered by the University of Kansas, Kansas State Historical Society, and Kansas Anthropological Association's Kansas Archaeological Training Program during the summer of 2008. Materials from the Hill site, 25WT1, were analyzed while on loan from the Nebraska State Historical Society, Lincoln. The completeness of these collections is questionable; particularly the assemblage from 25WT1, which likely represents only a small portion of the original excavated materials. This issue is discussed further in chapter 5.

Each chipped stone item from 14RP1 and 25WT1 was individually analyzed with several attributes noted and recorded in spreadsheets (Appendix). Material type was determined primarily by unaided visual observation, with select problematic pieces being viewed under ultraviolet light or with the aid of a microscope. Material types are discussed in chapter 4. Maximum length, width, and thickness measurements were taken to the nearest .10 mm. Maximum weight was recorded to the nearest .10 g. Provenience information was recorded for each item as completely as the field and catalogue records would allow. This information is provided in the Appendix. Each item was then categorized based on house association, artifact type, and material type. This allowed for comparisons of different artifact distributions, as well as different material frequencies within and among houses.

The entire available assemblage of excavated chipped stone artifacts from both sites will be considered in chapter 5. Distributions of chipped stone artifacts among specific houses are

possible only for the 14RP1 collection, since documentation and field records from 25WT1 are not available. For the same reason, only the European metal trade materials from 14RP1 can be included in intra-site comparisons. Chipped stone materials recovered in 2008 are discussed and compared as a separate data set because this sample represents only a partial lodge excavation and the only excavation where screening was employed. A summary of conclusions and considerations for further research and problems recognized are provided in the final chapter.

CHAPTER 2
A Brief History of the Pawnee

The Pawnee speak a Northern Caddoan language. This branch of the Caddoan language family also includes the Arikara, Wichita, and Kichai or Kitsai languages (Dorsey 1904; Lesser and Weltfish 1932; Parks 1979). The Pawnee historically occupied the Loup, Platte, Republican and upper Blue River valleys in east-central Nebraska and northern Kansas (Figure 1) (Roper 2006b:233; O'Shea 1989:53). In historic times, the Pawnee comprised four endogamous bands, each composed of several subbands and villages. The villages were organized into extended

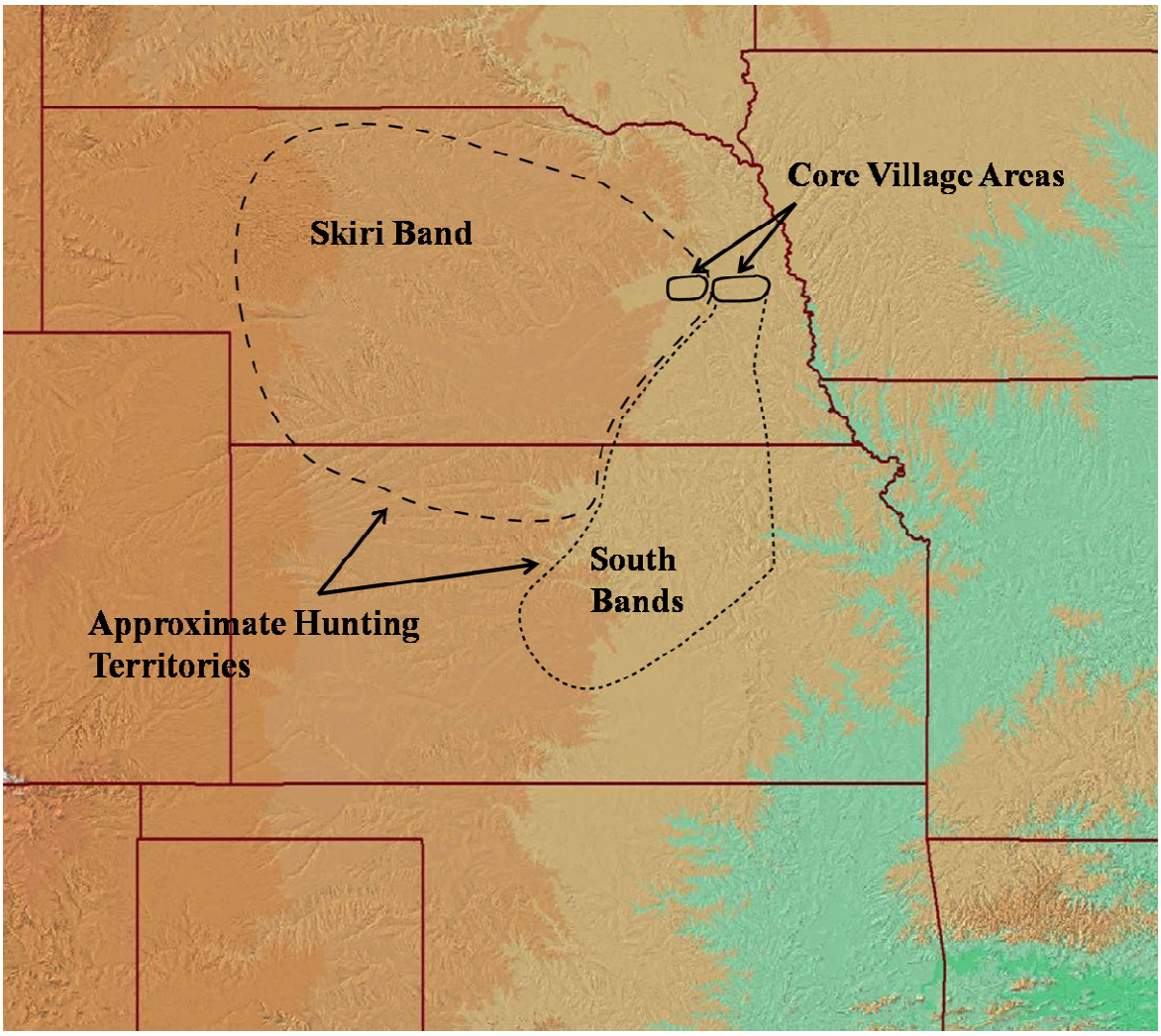

Figure 1: Map of Pawnee Territories (Adapted From Holen 1991:406).

families (Wedel 1936:3). The four bands are the Skiri (Wolf, Panimaha, or Loup), Chawi (Grand), Kitkahahki (Republican), and Pitahawirata (Tappage, or Noisy) (Roper 2006b:233; Grange 1979:134; Hudson 1982:8; Parks 1979a:200; Wedel 1936:3). The last three bands are distinct from the Skiri and are generally referred to collectively as the South Bands or Pani in older documents (Holen 1991:400; Roper 2006b:233; Parks 2001:515). They speak the South Bands dialect whereas the Skiri speak the Skiri dialect (Lesser 1979:260; Roper 2006b:233). Dorsey (1906:8) relayed a Pitahawirata tradition that the three South Bands were originally a single band called the Kawarahki that split into the three bands in historic times. Documentary evidence bears this out and suggests that the split occurred in about the 1760's to 1770's (Grange 1979:139; Roper 2006b:246).

The Pawnee are related linguistically and culturally to the Wichita to the south and the Arikara to the north (O'Shea 1989:53; Parks 1979b:236). Sorting out the origins of the Pawnee as well as their relationship to the Wichita and Arikara has been a longstanding source for discussion, and much ink has been spilt on the subject. Several models suggest the ancestral group to the Pawnee, Arikara, Kitsai, and Wichita originated in the southeast with a subsequent migration north (Lintz 1979:161; Wedel 1979:272). During this migration, the Wichita split apart from the others, followed by the Kitsai (O'Shea 1989:53). The Arikara and Pawnee split relatively recently, perhaps only 500 years ago (Grange 1979:146). This model, in opposition to in-place development, supports the suggestion that the Arikara and Skiri were at one time members of the same tribal group (Dorsey 1904:8; Hudson 1982:8; Murie 1981:197). It was also this model that led Strong to oversimplify that "the Arikara of today were probably the Pawnee of yesterday, and they in turn dissolve into the riddle of Caddoan origins in the Southeast" (Wedel 1976). The Skiri are the closest related linguistically to the Arikara, and are traditionally

distinct from the South Bands, perhaps reflecting a somewhat different origin and history (Dorsey 1906; Hudson 1982:8; O'Shea 1989:54; Roper 2006b:246).

This project focuses specifically on the chipped stone industries of the Kitkahahki or Republican band of Pawnee. The Kitkahahki were first mentioned as a distinct band in 1775 (Kinnaird, ed., 1949, 1:228; Roper 2006b:234). The Kitkahahki are closely associated with the Republican River. They occupied villages in the Republican River valley periodically from at least 1777, when Cruzat, the lieutenant governor of Louisiana, identified the "La Republic" as living near the Republican River (Roper 2006b:234). When they left the valley is less clear. It appears they left the Republican River valley for the Loup or Platte River sometime around 1800 or shortly after (Adair, Roper, and Hofman 2008:4). Vial reported them on the Loup River in 1804, as did Lewis and Clark in 1805 (Roper 2006b:235-236). They clearly had returned by 1806 since it was in that year that Zebulon Pike visited the village represented by the Hill site (25WT1) (Hill 1927). They were subsequently raided by the Kansa and returned to the Platte and Loup Rivers by 1811, at which time Sibley visited them there (Roper 2006b:237). The Kitkahahki had returned to the

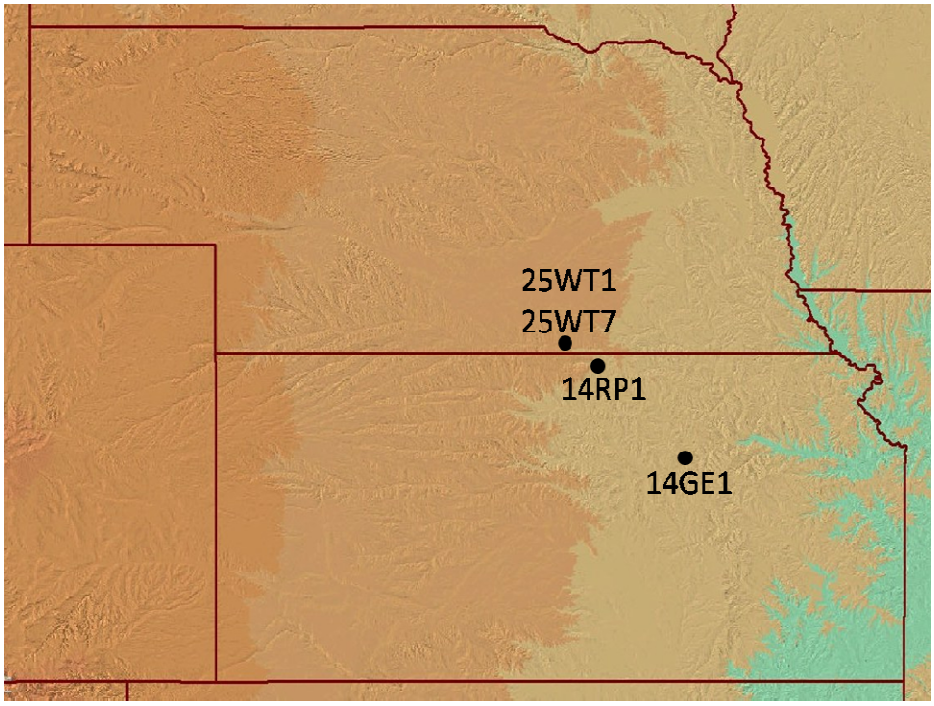

Figure 2: Location of the Four Kitkahahki Village Sites.

Republican valley around 1823, and remained there until 1831. At this time, they were attacked by the Kansa once more (Roper 2006b:238). The Kitkahahki ceded their lands along the Republican River in the Ellsworth treaty of 1833, at which point they were again living on the Loup River (Adair, Roper, and Hofman 2008:3; Roper 2006b:238).

Only four documented archaeological Kitkahahki villages are known in the Republican River valley (Figure 2). These include the Pawnee Indian Village (14RP1); Hill, or Pike-Pawnee site (25WT1); the Shipman site (25WT7); and the Bogan site (14GE1) (Roper 2006b:240). Sites 14RP1 and 25WT1 are the two primary sites considered in this study. They are discussed in detail in chapter 5. Bogan and the Shipman site are briefly discussed below.

The Shipman site is located near 25WT1 between the towns of Red Cloud and Guide Rock on the south bank of the Republican River in Webster County, Nebraska (Grange 1968:25). The Nebraska State Historical Society excavated a portion of the site in 1941 under the direction of A. T. Hill (Grange 1968:25). The dimensions of the lodges excavated suggest a Central Plains tradition occupation, except for a single circular lodge on the west edge (Grange 1968:25). This single lodge is interpreted to be overflow from the adjacent 25WT1 on the western edge of the site (Grange 1968:25). Although many chipped stone artifacts were recovered during the 1941 excavations, they are all characteristically Upper Republican or Smoky Hill phase (Ludwickson, Nebraska State Historical Society, personal communication 2008). For this reason, the Shipman site chipped stone was not included in this report.

The Bogan site is located on the west side of the Republican River in Geary County, Kansas, and is the southernmost recorded Kitkahahki village site (Marshall and Witty 1967:3). The site was briefly investigated before the completion of Milford Reservoir, although it is not normally inundated. It is a small village site, consisting of at least three visible house

depressions and more indicated through geophysical survey, as well as associated pit features and a fortification structure. The site was originally described and tested by Floyd Schultz in 1930 (Marshall and Witty 1967:6). Schultz provided an incorrect legal description, however, and the site was "lost" until the construction of Milford Reservoir in 1964. At this time, it was recognized by Thomas A. Witty after it was brought to his attention by a local resident (Marshall and Witty 1967:6). Limited testing of the site was carried out by the University of Nebraska with James Sperry and Richard Krause under the supervision of Preston Holder, with sponsorship from the National Park Service (Marshall and Witty 1967:6). In 1967, the Kansas State Historical Society, under the direction of James Marshall and Thomas Witty, excavated a single house. They also conducted minimal tests in a pit depression and along the fortification structure (Marshall and Witty 1967:7). Witty and Marshall refer to "31 specimens of worked and unworked stone" (Marshall and Witty 1967:13) in their report, but all lithic artifacts in the collection are ground stone and not chipped. Therefore, unfortunately, the Bogan site has no known chipped stone materials for consideration in this study.

CHAPTER 3
Site Backgrounds and History of Investigations

Pawnee Indian Village Site (14RP1) Background

The Pawnee Indian Village (14RP1) is located in Republic County, Kansas on the south bluff of the Republican River approximately one mile south of the mouth of White Rock Creek (Figure 3). When exactly the site was inhabited remains uncertain. Hyde suggests the Kitkahahki were in the Republican River valley periodically from 1770 until about 1825 (Hyde 1951:127). Roper (2006b: 234-238) notes dates of 1770's to 1831 for documented reports of the Kitkahahki in the Republican River valley. Although the Kitkahahki were in the area from the 1770s to 1820s, identifying which villages were occupied when remains a

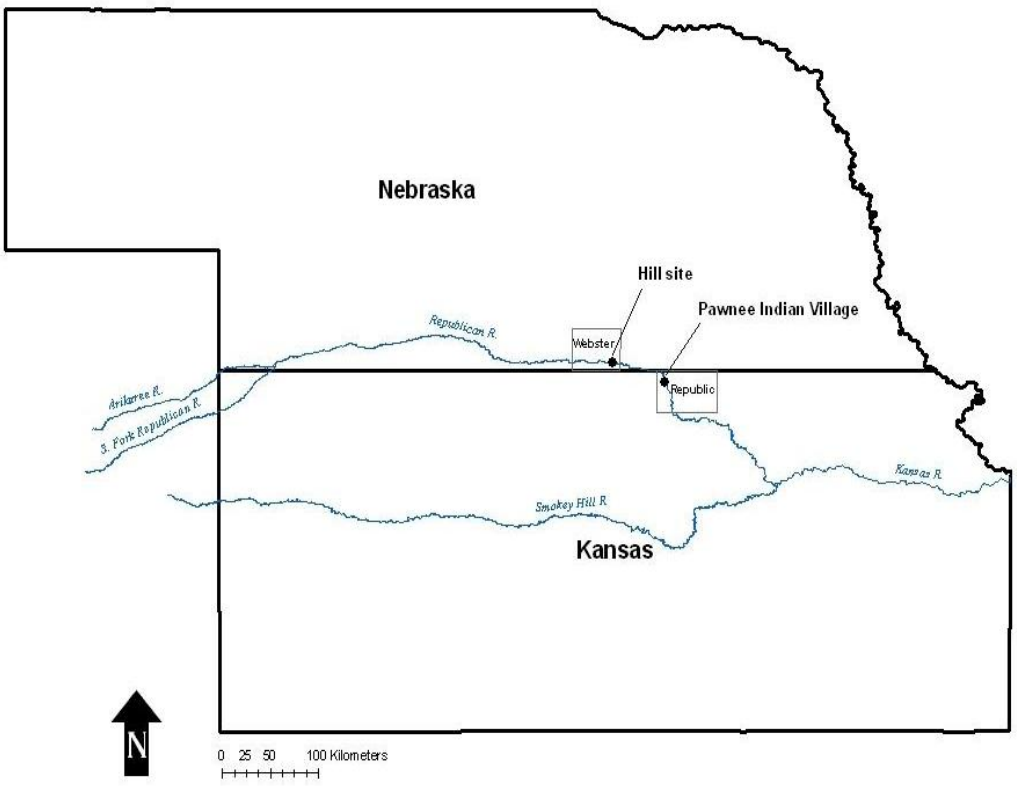

Figure 3: Location of the Pawnee Indian Village (14RP1) and the Hill Site (25WT1).

question whose answer is being constantly refined. Smith believed 14RP1 was occupied prior to 1802 but not much earlier than 1777 (Kivett 1957:5; Smith 1950:2; Grange 1968:26). Whether this was a continuous occupation or periodic remains unclear. Wedel suggests dates of occupation after 1775 (Wedel 1959:60; Grange 1968:26) but pre-1800 (Wedel 1959:535; Grange 1968:26). Similarly, Roberts states that 14RP1 was most likely occupied during the 1770s but abandoned prior to the turn of the century (Roberts 1975:178-179). He also suggests, based on ceramic formula dating, that the site may have been reoccupied in the 1820s (Roberts 1975:180; Grange 1984:277). During the period of abandonment of 14RP1, Roberts postulates the Kitkahahki were occupying the Bogan Site (Roberts 1975:179). Based on previous research, dates of 1770 to around 1800 appear to be the primary occupation range for the site, with a possible short-term reoccupation after 1820.

The Pawnee Indian Village is one of the southernmost known sites of the Pawnee and is only one of two identifiable Pawnee village sites within the State of Kansas (Roberts 1975:7). It was once believed to be "the place where Jedediah Smith wintered uncomfortably in 1825-1826 during the temporary absence [or complete abandonment] of the Indians" (Wedel 1986a:156). However, based on the proposed dates of occupation for the site, this is very doubtful.

The land the Pawnee Indian Village occupies was identified in 1875 and subsequently purchased and protected from additional plowing by Elizabeth and George Johnson under the supposition that it was the location American Lieutenant Zebulon Pike had visited in September of 1806 while on his Southwest Expedition (Platoff 1999:4). On the heels of the Louisiana Purchase and near the conclusion of Lewis and Clark's expedition, Pike had been sent on a multi-faceted mission which included locating the headwaters of the Arkansas and Red rivers as well as establishing peace between the Kansa and Osage (Oliva 2006a:14-33). Pike would travel

through what is now Kansas, making him the first U.S. Army explorer to cross the state, and he would pass within miles of the Pawnee Indian Village (Figure 4) (Oliva 2006a:14-33).

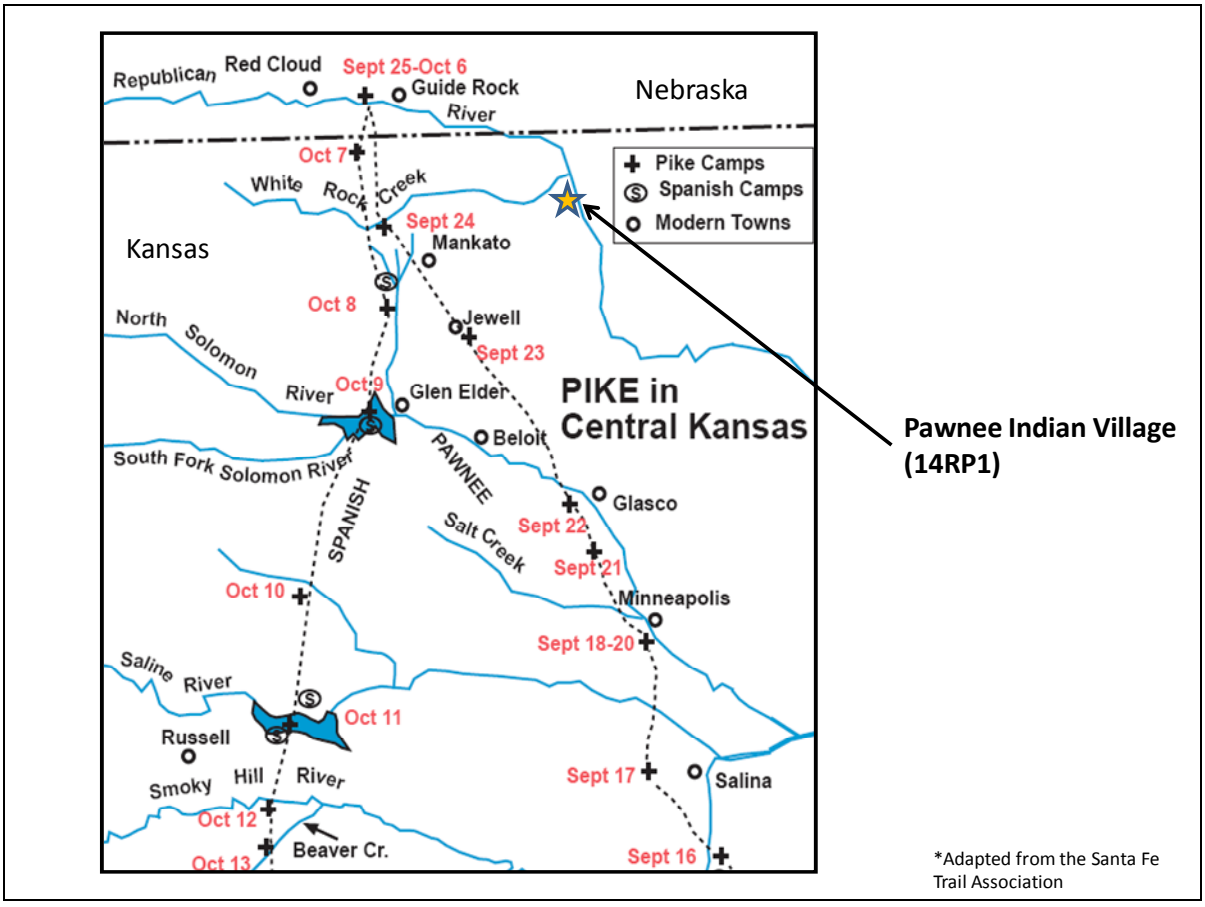

Figure 4: Pike's Route in Relation to 14RP1.

The Johnsons donated the property to the State of Kansas on July 6, 1899 under the condition that the land would be set aside as a park (Laugesen 2000:175; Morehouse 1927:226). In response, a wrought-iron fence was built around six (of the less than twelve remaining) acres of property, and a twenty-six foot tall granite monument commemorating Zebulon Pike's supposed visit was erected in 1901 (Morehouse 1927:226-227). With the raising of the monument, the village also acquired a new name; the Kansas Monument Site (Wedel 1936:33). However, by 1906 and the centennial celebration of Pike's visit, suspicion was mounting as to

whether this Pawnee village was the actual one Pike had visited between September 25th-October 7th 1806 (Wedel 1936:33). This is in large part due to A. T. Hill who was present at the centennial celebration and was not convinced that the Kansas Monument Site was the correct location of Pike's visit (Wedel 1953:72). He thereupon set out to find the true location of this historic event and subsequently located the Pike-Pawnee site (or Hill site, 25WT1) in Webster County, Nebraska in 1923 (Wedel 1936:34, 1953:72). The Hill site, located approximately 49 km upstream from 14RP1 is overwhelmingly accepted today as the location of Pike's historic 1806 visit. An analysis of chipped stone materials from both the Hill site (25WT1) and the Pawnee Indian Village (14RP1) may help shed light on and provide supporting evidence to better interpret the relationship of these Pawnee sites.

History of Investigations at 14RP1

Twenty-two known lodge depressions, numerous associated storage pit features, and the remains of a fortification structure are still visible in the protected portion of 14RP1 (Figure 5) (Roberts 1975:4; Roper, Adair and Hofman 2008:13; Witty 1968:4). At least four more lodges, although not visible on the surface, have been recorded. The original site was more extensive than this, with a substantial and currently unknown portion of its southern edge destroyed by road construction and agriculture. Both the northern and southern portions of the site (separated today by a gravel county road) have been investigated numerous times in the past.

Surface collecting of artifacts from these locations was a common practice for those that lived in the vicinity. Charles S. Scott who lived near the village as a young child prior to any farming in the area attests to this: "From the circles we took many articles, such as beads, stone hatchets, pipes, tomahawks, etc.; also great quantities of bones" (Morehouse 1927:231). Amateur excavations probably were carried out by locals or visitors during this period, and the

quantity of materials taken from the site in these early years will never be known.

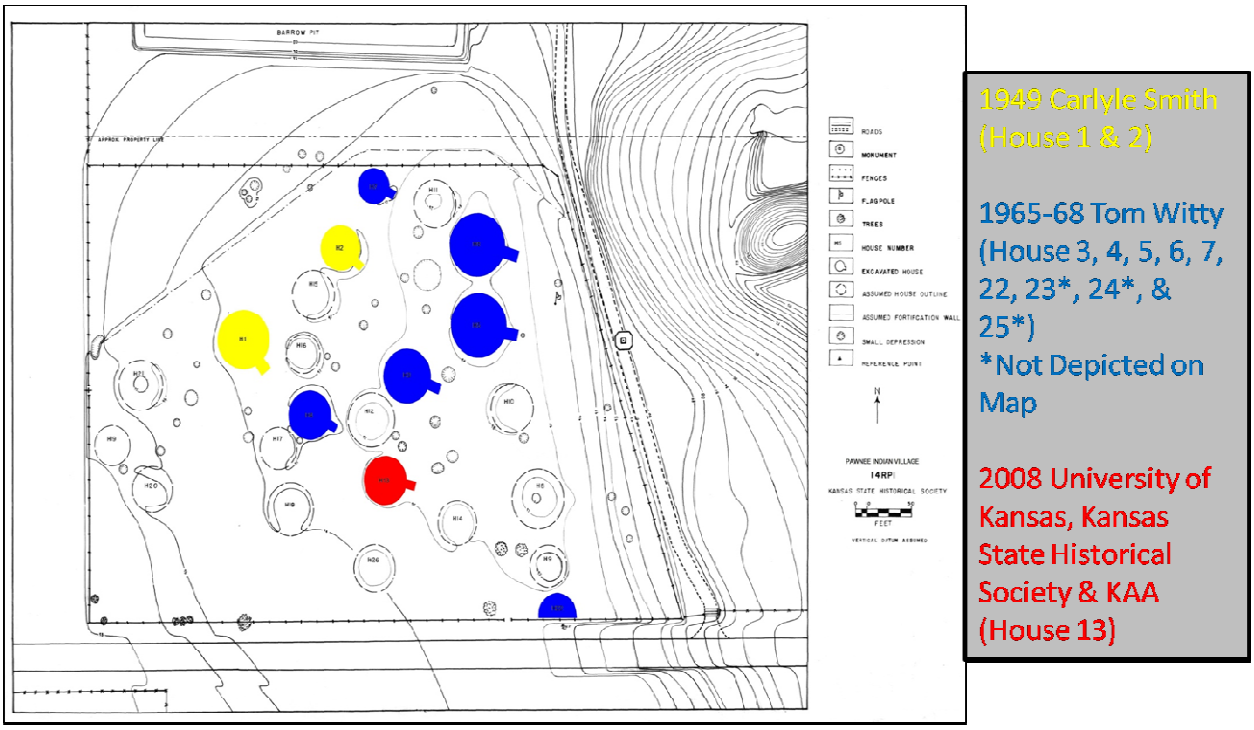

Figure 5: Map of Excavated Lodges at 14RP1.

The first documented archaeological excavations were conducted by Floyd Schultz and George Lamb on three lodges in 1933. These excavations focused primarily in the field south of the fenced portion of the site (Smith 1949b). Little is known about these early digs and relatively few artifacts were recorded (n=19 are currently housed in the Archaeological Research Center at the University of Kansas). The first systematic excavations with substantive documentation were in 1949 when Carlyle Smith from the University of Kansas, along with his wife and seven students excavated two lodges (Houses 1 and 2) on the state property, as well as at least one burial (Roberts 1978:8; Smith 1949a:5). In 1957, Roscoe Wilmeth excavated a five-foot square within the fenced portion of the site and another just outside the fence, but found nothing (Hawley 2005:50; Wilmeth 1957:200). From 1965-1968, State Archaeologist Thomas A. Witty, Jr., excavated an additional nine lodges (Houses 3, 4, 5, 6, 7, 22, 23, 24, 25), as well as several

burials, and the Pawnee Indian Village Museum was constructed over the in-situ remains of House 5 in 1968 (Witty 1968:4). Also during this time, in 1964, two University of Kansas students, Jack M. Shock and Bobby Gilbert, made a surface collection from the south portion of the site. In 1984, Jeffrey Eighmy conducted archaeomagnetic sampling on the clay floor of House 3 and the hearth of House 21. In 1995, Martin Stein of the Kansas State Historical Society, Topeka, directed a metal detector survey and recovery of metal artifacts preceding the construction of a handicap ramp and sidewalk to the museum. David Maki conducted a magnetic field gradient survey over 1.4 hectares and high-resolution electrical resistance survey over 0.45 hectares of the site in 2007 (Maki 2007:4). The most recent investigations to be carried out at the site were in the summer of 2008 by the University of Kansas Archaeological Field School, the Kansas State Historical Society, in conjunction with the Kansas Anthropological Association's Kansas Archaeological Training Program (KATP). A portion of House 13 was excavated at this time.

The Hill Site (25WT1) Background

The Hill Site (25WT1), also known as the Pike-Pawnee Village and Superior 1 is a Kitkahahki Pawnee village located seven miles east and two miles south of the present town of Red Cloud, Nebraska (Wedel 1936:34; Grange 1968:24). The site lies on a flat terrace 25 to 30 feet above the current flood plain of the Republican River and approximately a quarter-mile south of the modern river channel (Grange 1968:24; Metcalf 1947:4). It is perhaps most famous for being the remains of the Pawnee village that Lieutenant Zebulon Pike and his crew visited in 1806 (Munday 1927:168). Pike camped near the village from September 25th to October 7^{th,} and on September 29th ordered a Spanish flag that was flying outside one of the lodges be replaced with the flag of the United States (Oliva 2006a:24). The Spanish flag had been given to the

Pawnee by Lieutenant Don Facundo Melgares who had visited the village a few weeks prior (Oliva 2006a:17). The flag incident would become a historical debate between the states of Kansas and Nebraska, with both sides laying claim to one of the earliest flag raisings west of the Missouri (Hill 1927).

As with 14RP1, the chronology of the Hill site remains problematic. Strong suggests it dates "from the period around 1800" (Strong 1935:56). Wedel describes peace medals and buttons discovered at the site (including a Spanish medal dated 1797, an English medal dated 1762, an American medal similar to those issued after 1801, and a military button or hat plate likely from Pike's 1st infantry visit in 1806), but he does not provide a timeframe for occupation (Wedel 1936:36; Kivett 1957:3). In 1968, Grange suggested the occupation of the Hill site was between 1777 and 1811, but may have lasted to 1815 or later based on military items present at the site (Grange 1968:25; Kivett 1957:3). However, in 1989 Grange proposed a different time of occupation, 1775-1820 (Grange 1989:2). Grange also provides a mean formula date of 1811 using the ceramic formula method (Grange 1984:284). The Hill site may have been occupied from at least 1776 (although it is doubtful the Hill site is the village Cruzat described in 1777) until about 1809-1810 (Metcalf 1947:1). Metcalf suggests a narrow range of occupation from "the period of 1800-1810, with the earlier date somewhat uncertain" (Metcalf 1947:73). What is certain is that the Hill site was occupied in 1806 when Zebulon Pike passed through the area and Roberts (1975:180) notes the possibility that 14RP1 may have been abandoned by this time. Pike recorded a total of forty-four lodges in the village in 1806 (Hyde 1951:366; Hill Field Notes on file at the Nebraska State Historical Society, Lincoln) Over a hundred years later, the remains of close to one hundred lodges were noted (Figure 6) (Hill Field Notes on file at the Nebraska State Historical Society, Lincoln). This is likely a reflection of how long the village was

occupied; lodges would periodically deteriorate and be burned down, taken apart or reconstructed throughout the time span of the village occupation, leaving archaeological evidence for the entire number of lodges built, not the number of lodges that may have been in use at any one time (Hill Field Notes on file at the Nebraska State Historical Society, Lincoln). Pike also documents extensive gaming courts on each side of the village (Munday 1927:174), and several burial areas have been located on the higher elevations south of the site (Metcalf 1947:4). There is no evidence of a fortification (Metcalf 1947:4).

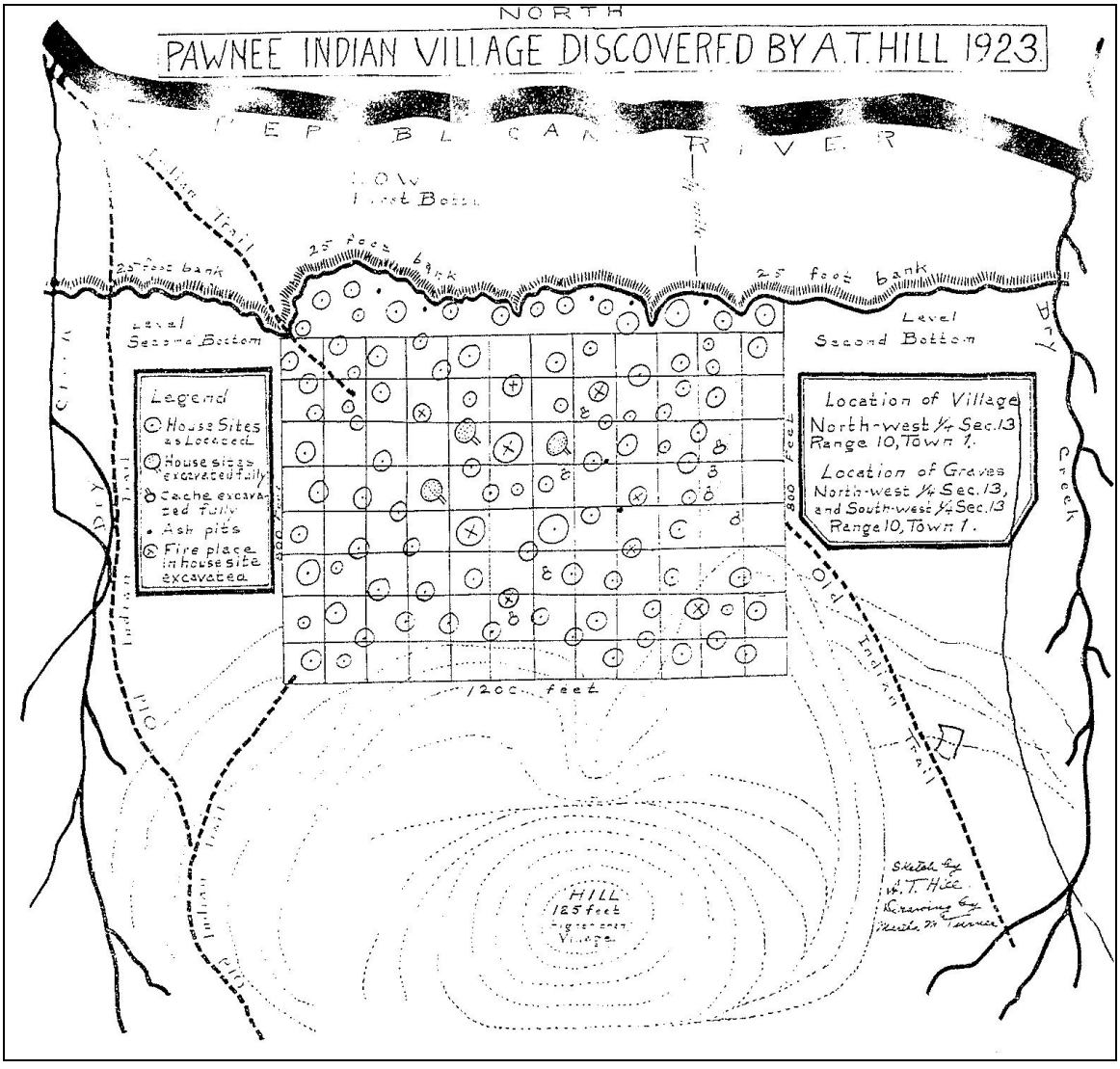

Figure 6: Sketch of the Hill Site by A. T. Hill.

History of Investigations at 25WT1

Although known to locals for many years, the Hill Site was first identified in 1923 by an avocational archaeologist, A. T. Hill, while searching for the true location of the Pawnee village Lieutenant Zebulon Pike visited in 1806 (Wedel 1936:34). The first to plow this area recalled when "they gathered great numbers of stone mauls, axes, war clubs and such like and threw them in the holes and plowed over them . . . The land was literally covered with such relics of Indian life" (Hill 1927:163). Hill cites the year of 1872 when land owner George DeWitt's father homesteaded the property and first broke ground, and Metcalf noted in 1941 that the land had been cultivated for over sixty years (Hill 1927:163; Metcalf 1947:4). This leaves a gap of around fifty years of undocumented surface collecting and probable subsurface looting at the site. Metcalf mentioned that "the site has been searched by relic hunters for many years and surface remains are not now abundant except after the site has been newly plowed and subjected to dashing rains" (Metcalf 1947:5).

In November of 1923, Hill and Dewitt excavated a Pawnee grave on the main burial hill south of the site (Hill 1927:164). The artifacts recovered during this excavation, namely European trade items including a Spanish bridal bit and spur, deeply interested Hill and sparked his belief that this village could have been the one visited by Pike and others (Hill 1927:163). The following spring, with a representative of the Nebraska State Historical Society and several others, Hill opened an unspecified number of graves (Hill 1927:164). The site quickly became an obsession and to prevent further relic hunting on the land, Hill purchased it in March of 1925, acquiring a total of 320 acres on two separate farmsteads (Hill 1927:165). The site itself covers approximately 25 acres of this land, at least twice the size of the village near Republic, Kansas (Wedel 1936:33-34).

From 1924 until 1930, Hill excavated a minimum of fifty-one burials (Metcalf 1947:61-68), and two lodges (Wedel 1936:49). During this time, Hill "found in the village and graves pottery, rude stone and metal implements, beads, arrows, arrow points, cut by the Indians from metal hoes, colored paint, Spanish bridle bit, battle axes, stone clubs, grain grinders, and many other articles used by the Indians when passing from a stone to a metal stage of development" (Munday 1927:186-187). In 1930, the University of Nebraska Archaeological Survey under the direction of William Duncan Strong spent two weeks completely excavating one lodge and three graves from Burial Hill 1 (Weymouth 1982:1). During this time, Waldo Wedel served as Strong's research assistant and would continue to study the Pawnee artifacts from the Hill site for several weeks after the excavation (Strong 1935:56; Wedel 1936). The results of his work was a 1930 Master's thesis, later in 1936 published as *An Introduction to Pawnee Archeology*, less than a year after Strong's publication *An Introduction to Nebraska Archaeology*. For this reason, these few weeks in Webster County, Nebraska, and the interactions of Hill, Wedel, and Strong, have been referred to as the "Perfect Storm" in the development of Central Plains Archaeology and Pawnee research in particular (Adair 2008).

More excavations would follow in the summer of 1941 by the Works Progress Administration under the direction of Marvin Kivett and Robert B. Cummings, Hill, who was then the head of the Nebraska State Historical Society, and George Metcalf (Metcalf 1941). A total of five more lodges were excavated, one of which (House 5) contained five internal cache pits (Metcalf 1947:7-22). Three outside cache pits and several test trenches were also excavated during this time (Metcalf 1947:7-29). In addition, thirty-six more graves were exhumed: twenty-one on Burial Hill 2, eight along the northern terrace, and seven from Burial Hill 1 (Metcalf 1947:4). This equals at minimum 90 documented burial excavations in addition to

Metcalf's reference to as many as 75-100 graves opened mainly by relic hunters (Metcalf 1947:37). Metcalf returned at least once in 1943 for testing and surface collecting (Metcalf 1947:5). The last archaeological activities at the site were a magnetic survey conducted over 0.6 hectares of the village by John Weymouth for the Nebraska State Historical Society in 1982 (Weymouth 1982:5), and limited testing in 1987 by Robert T. Grange Jr. (Grange 1989:3).

CHAPTER 4
Lithic Material Types

The primary techniques utilized for determining lithic material type in this study include visual observation of color, texture, and inclusions as well as limited use of ultraviolet fluorescence analysis (UVFA). The lithic comparative collection at the University of Kansas Archaeological Research Center was utilized, and a microscope was used to observe inclusions when macroscopic observations proved insufficient. Cortex, if present, allowed a determination as to whether sources were derived from river gravels or if they originated from bedrock or residual deposits. Representations and frequencies of differing material types at sites may provide information about territoriality, trade interactions, and changing hunting patterns through time (Holen 1991:399-411). The introduction of European metal items and increased involvement in the fur trade transformed lithic procurement practices and lithic utilization during the protohistoric and historic periods. Examining individual material types and assessing frequencies within sites may shed light on the implications of European trade items on traditional life-ways. Each major (ten or

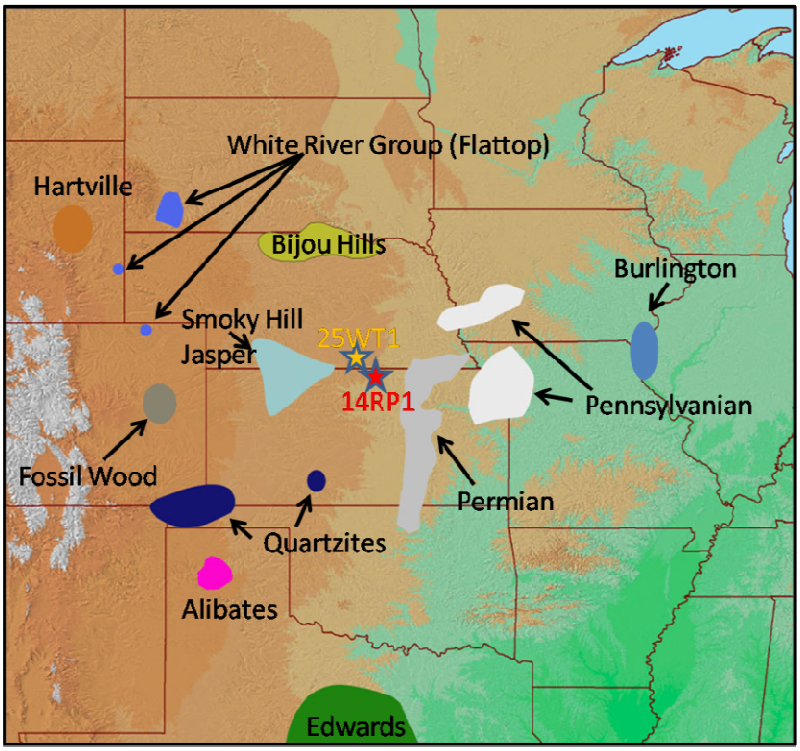

Figure 7: Map of Approximate Lithic Material Primary Locations.

more) and minor (nine or fewer) lithic category present at 14RP1 and 25WT1 is discussed below, and primary source locations are displayed in Figure 7.

Major Lithic Materials

Alibates Agatized (Silicified) Dolomite: Alibates silicified dolomite is a member of the Permian age Quartermaster formation (Hofman 1991:340). The primary high-quality Alibates bedrock source is restricted to a small area in the southern Texas panhandle along the Canadian River in Potter County, Texas (Banks 1990:91; Hofman 1991:340; Wyckoff 1993:35). However, Alibates also occurs in gravels washing out of the natural area of occurrence in streams, particularly the Canadian and Washita rivers (Banks 1990:91; Vehik 1990:140; Wyckoff 1988:15). Both large quarry blanks and river cobbles were extensively sought after and traded, with artifacts of Alibates manufacture appearing at sites from Paleoindian through the protohistoric period in the Central Plains (Vehik 1990:140; Wyckoff 1993:37). Alibates ranges in color from dark purples and maroons to light pinks and even white. Typical shortwave ultraviolet fluorescence is a mottled light green-pale green response for white pieces and no response (purple) for darker varieties (Hofman, Todd, and Collins 1991:299). Red-maroon Alibates pieces are nonresponsive to longwave fluorescence, resulting in a purple-black display whereas white fragments often have a white-grey response (Hofman, Todd, and Collins 1991:299).

Permian (Florence) Cherts: Permian chert nodules erode from Permian system limestone outcrops and are found throughout the Flint Hills Upland of Kansas (Stein 2006:270). The Permian system extends north to south across the entire state of Kansas in a belt 80 km. wide on average (Banks 1990:96). At least 13 different chert bearing formations are found in this area (Banks 1990:96). These include three varieties of Wreford chert and four varieties of Florence

chert (Stein 2006:271). In this study, distinctions were made between Florence A (also called Maple City chert or Kay County chert) and Florence B, but other varieties were difficult to distinguish. For this reason, all Permian cherts were classified under the broad heading of Florence chert during this study in an attempt to easily designate cherts that originated from the Flint Hills region. Florence A, associated with the southern Flint Hills near the Kansas-Oklahoma border, is typically light brown to buff yellow-grey in color and often contains large fusilinid fossils (Stein 2006:271). This material responds well to heat treatment and is often found with pink and lustrous surfaces reflecting heat treatment or burning. Florence B also often contains fossil fusilinids but is blue-grey in color (Stein 2006:271). Some Florence exhibits a faint brown-orange fluorescence with nonresponsive cortex when exposed to shortwave and longwave ultraviolet light (Hofman, Todd, and Collins 1991:301).

Quartzite: Several varieties of quartzite are recognized in these assemblages but are grouped under the general heading of quartzite for most analysis because of the difficulty of accurately distinguishing between different varieties. The varieties include Dakota quartzite, Ogallala and Bijou Hills quartzites, and Sioux quartzite, all of which have different origins. Dakota quartzite occurs as localized cobbles in the sandstone matrix of the Cretaceous-age Dakota Formation (Banks 1990: 94; Stein 2006:275, Mandel 2006:16). The Smoky Hills region of Kansas contains hills, commonly referred to as the Dakota Hills, capped with thick deposits of Dakota sandstone containing these quartzite cobbles (Mandel 2006:16). Dakota quartzite is variable in color but typically occurs as light brown or grey to greenish-tan but can be white or dark red (Banks 1990:94).

Bijou Hills quartzite, also known as Bijou Hills silicified sediment and Ogallala Orthoquartzite is a Pliocene/Miocene quartzite of the Valentine and Ash Hollow members of the

Ogallala formation that originates in south-central South Dakota and north-central Nebraska (Ahler 1977:137-138; Bakken 1995; Stein 2006:278). Smaller fluvial and glacial deposited gravels occur in northwestern Iowa (Ahler 1977:137-138; Bakken 1995; Stein 2006:278). This material has a characteristic granular quartzite structure and is typically light green to greenish-grey in color (Ahler 1977:137; Bakken 1995). A distinct green Ogallala quartzite is also found in southern Nebraska (Banks 1990:95). In the Ash Hollow, Sidney, Kimball, and Valentine members of the Ogallala formation is a wide range of metaquartzites and orthoquartzites ranging from fine-grained compact quartzites to less consolidated sandstones (Holen 1991:401). These range from brown to tan in color, and occasionally are white. They often are found in massive gravel outwash concentrations from the High Plains (Banks 1990:95-96).

Pleistocene age deposited Sioux quartzite cobbles, which originate in the Precambrian of southwestern Minnesota, south-central South Dakota, northwestern Iowa, and northeastern Nebraska, occur as erratics in the glacial till of northeastern Kansas (Anderson 1987:17; Stein 2006:278; Merriam 2003:22). Sioux quartzite is highly resistant to erosion. It ranges in color from light pinks to deep maroons or reds (Anderson 1987:77).

Smoky Hill Silicified Chalk (Jasper): Smoky Hill jasper, also known as Republican River jasper, Niobrara jasper, Niobrarite, Alma, Quartelejo jasper, and Graham jasper, is found in northwestern Kansas and south-central Nebraska and is the principle chert-bearing formation of the central Great Plains (Banks 1990:96; Hofman, Todd, and Collins 1991:300; Hofman 1991:341; Stein 2006:275). Smoky Hill jasper occurs in beds of usually thin tablets in the Smoky Hill chalk member of the Niobrara formation of Cretaceous age silicified chalk and has been extensively used as a lithic resource on the Central Plains since Paleoindian times (Hofman 1991:341; Stein 2006:275; Wedel 1986b:28). Smoky Hill jasper is rarely translucent and can be

found in a variety of colors typically ranging from tan or yellow to light/dark brown but also including white, green, maroon-purple, red, and black (Banks 1990:96). Dendritic inclusions are occasionally present, but small yellow chalk inclusions are more common (Stein 2006:276). It also varies in degree of silicification. Smoky Hill is nonresponsive in ultraviolet fluorescence analysis, and exhibits a dark purple reflection under both shortwave and longwave ultraviolet light (Hofman, Todd, and Collins 1991:300).

Minor Lithic Materials

Basalt: Basalt is a fine-grained mafic igneous rock that is always dark grey or black in color. In general, basaltic refers to "all dense, dark colored, fine-grained, igneous or metamorphic stones having poor flaking qualities" (Ahler 1977:139). It occurs as cobbles in river gravels out-washed from the Rocky Mountains and in glacial till (Ahler 1977:139; Skinner and Porter 2000:105; Stein 2006:265). A similar material called Trachite occurs in the lag gravels of the Ogallala formation as well. Basalt also occurs in the Ozarks region of Missouri as intrusive dikes through older rhyolite and granite deposits (Ray 2007:71). Basalt is nonresponsive to ultraviolet light.

Boone/Reed Springs Chert: Boone chert occurs in the Boone limestone Formation of the Mississippian system in southwestern Missouri, northeastern Oklahoma, and northern Arkansas (Ray 2007:194). Some Burlington-Keokuk cherts also have been called Boone (Ray 2007:195). Reed Springs chert occurs in continuous seams in the Mississippian-age Reed Springs Formation of limestone with a distribution similar to that of Boone chert (Cribbs 1940:582; Stein 2006:267). Reed Springs is considered one of the most variable lithic materials of the Ozarks, and up to twenty-seven varieties have been described (Ray 2007:174). Reed Springs and Boone both are typically white to grey in color, but can range considerably to olives, browns dark grays

and reds (Ray 2007:175-177). Reed Springs is less fossiliferous than older and younger deposits, with crinoid fossil segments being the most likely inclusion (Stein 2006:267).

Burlington Crescent: Burlington Crescent, also called Crescent Hills, Crescent Quarry, Highview chert, or simply Crescent chert occurs in the Burlington-Keokuk Limestone Formation of the Mississippian system as small to large round or elongated nodules (DeRegnaucourt and Georgiady 1998:172; Lopinot, Ray, and Conner 1998:224; Ray 2007:192). Burlington outcrops as bedded lenses in west-central Illinois, east-central and southwestern Missouri, and southeastern Iowa, and is also found as irregular out-washed river cobbles in these areas (DeRegnaucourt and Georgiady 1998:172). Burlington limestone stretches into southeast Kansas, but covers only approximately 60 square miles of the southeast corner of the state in Cherokee County (Ray 2007: 192; Stein 2006:267). Five varieties of Burlington chert have been recognized: Generic, Keokuk, High Ridge, Mozarkite, and Graydon (Ray 2007:193). Burlington chert color is highly variable. Keokuk and Generic Burlingtons are typically cream white to grey in color (Ray 2007:194-195; DeRegnaucourt and Georgiady 1998:172). The other three varieties exhibit more diversity in color, ranging from whites to yellows and brown and even reds, pinks, purples and dark gray/black (Ray 2007:195-196). Banding is very rare, and a dull luster is typical (Ray 2007:194). Crinoids are the most likely fossil inclusion, sometimes covering up to 90% of the matrix (Ray 2007:194). Burlington is essentially nonresponsive to ultraviolet florescence analysis. Heat treatment typically results in a pink lustrous response (Ray 2007:196).

Chalcedony: Flattop Chalcedony is one of the most commonly occurring varieties of chalcedony in Central Plains sites. Flattop is a member of the Oligocene-age White River Group silicates from the chalcedony exposures of the Chadron Formation in northeastern Colorado,

southwestern South Dakota, and western Nebraska (Hoard et al. 1993:698; Hofman, Todd, and Collins 1991:302; Grieser 1983:6). Flattop is named for its source area on Flattop Butte, Colorado, northwest of Sterling (Grieser 1983:6; Hoard et al. 1993:700; Hofman, Todd, and Collins 1991). It usually appears as translucent to creamy white to pinkish-red in color with a dull to waxy luster (Ahler 1977:134-135). Shortwave ultraviolet tests result in a dull green mottled response with bright green speckles (Hofman, Todd, and Collins 1991:302). Longwave ultraviolet results in dark green mottles in a dark purple matrix, often with some orange areas near weathered cortex (Hofman, Todd, and Collins 1991:302).

The White River Group Silicates "outcrop extensively in the badlands areas of northwestern Nebraska and in the Big Badlands in South Dakota" (Ahler 1977:134). West Horse Creek chert and Scenic chalcedony occur in these areas. West Horse Creek chert "ranges in color from light purple to gray, often with banding, gray lenses, and occasionally a reddish tint or vein" (Hoard et al. 1993:700). Scenic chalcedony is usually dark brown in color (Hoard et al. 1993). Plate chalcedony, also called Badlands chalcedony, occurs as primary and lag deposits in these exposures as angular, parallel-sided plates (Ahler 1977:136; Roper, ed. 1989:243). These chalcedonies typically range from grey to pink, and are often translucent (Ahler 1977:136). A distinct white chalcedony is also found within the Ogallala formations of southern Nebraska, but is not a member of the White River Group Silicates (Banks 1990:95).

European Flints: Two European flints were identified in this study, English and French. English flint occurs as nodules in Cretaceous-age chalk near the Cliffs of Dover in England (DeRegnaucourt and Georgiady 1998:223). English flint tends to have chalky white cortex and ranges in color from grey to dark grey and even black (DeRegnaucourt and Georgiady 1998:223). This variety of European flint is often referred to as Brandon, after the town near its

primary deposits. French flints are also found in Cretaceous-age chalk but have a characteristic amber to translucent yellow or honey brown color (DeRegnaucourt and Georgiady 1998:225). All European flints included in this study occur as gunflints that were traded into the sites.

Fossil Wood: Fossil or agatized wood typically occurs as out-washed river gravels, but a common source in Paleoindian times was the Black Forest area of Colorado (Hofman, Westfall, and Westfall 2002; Jodry 1999). Also, fossil wood occurs in the Pennsylvanian-age Englevale sandstone member, but it is unknown if this source was used prehistorically (Stein 2006:270). Fossil wood also occurs in the Ogallala Formation but often has the growth rings preserved which interfere with flaking (Herman, Holen, and Peterson 1995:86). Ogallala Formation Silicified Wood is often translucent or opal in appearance (Herman, Holen, and Peterson 1995:85).

Obsidian: Obsidian is an igneous dark volcanic glass with most known source areas in the Rocky Mountains or farther west (Stein 2006:281). Obsidian is widely distributed throughout Kansas. Obsidian artifacts have been reported from a protohistoric Pawnee site in Nebraska (Hughes and Roper 1991:79). These particular artifacts have been sourced to the Jemez Mountains of northern New Mexico near Taos, over 400 km from western Kansas (Hughes and Roper 1991:79; Hoard, Bevitt, and McLean 2008:219). Obsidian is nonresponsive to ultraviolet tests (Hofman, Todd, and Collins 1991:300).

Pennsylvanian Chert: Pennsylvanian cherts occur in limestone formations east of the Permian outcrops of the Flint Hills as small nodules and in thin, laterally uniform beds in eastern Kansas, western Missouri, southeastern Nebraska and southwestern Iowa (Hudson 1993:267; Herman, Holen, and Peterson 1995:85; Holen 1983:64-65; Merriam and Harbaugh 2004:3; Stein 2006:268). However, these cherts are often buried under glacial till in the northern portion of its

source location (Stein 2006:269). Pennsylvanian cherts are usually found in the bedrock of eastern Kansas, and as resistant caps of topographic highs in western Missouri (Lopinot, Ray, and Conner 1998:225; Stein 2006:268). Two of the most well-known and prehistorically used varieties of Kansas Pennsylvanian chert are Winterset and Westerville (Stein 2006:269). These varieties range in color from light to dark grey and pale brown to yellowish-brown (Stein 2006:269). Another variety, Warner chert of southwest Missouri, is sparsely to highly fossiliferous, typically containing crinoids and bryozoa fossils, and ranges in color from reds to dark grays and white (Lopinot, Ray, and Conner 1998:225; Ray 2007:298).

CHAPTER 5
Chipped Stone Analysis and Results

14RP1 Chipped Stone

There are n=353 (Figure 8; Appendix) pieces of chipped stone in the 14RP1 collection (not including House 13 which are discussed later). The primary material type for chipped stone artifacts at the site is Smoky Hill jasper (n=185; 52.4%), followed by Florence (n=40; 11.3%), Quartzite (n=33; 9.3%), and Alibates (n=25; 7.1%). These four materials account for 80 percent

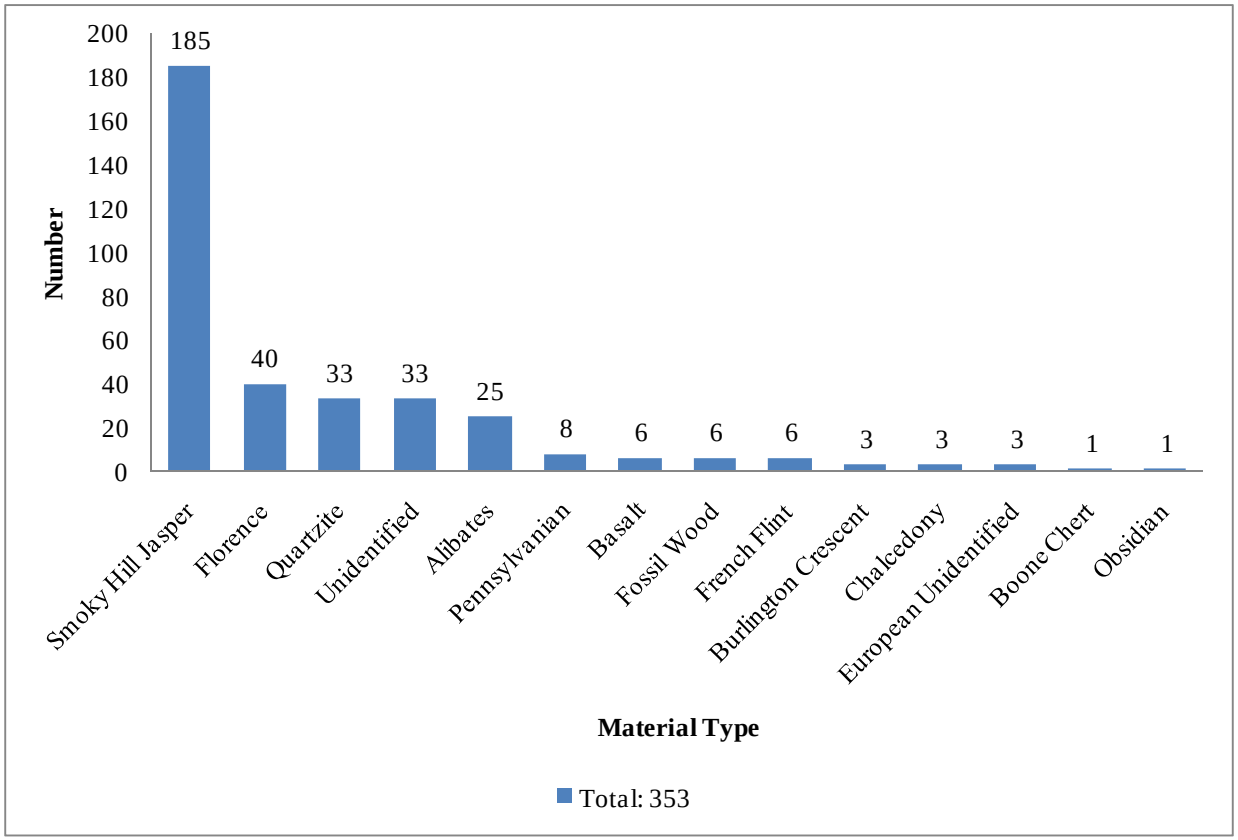

Figure 8: Chipped Stone Material Type Frequencies at 14RP1.

of the entire collection. All other material types have a relatively minor representation in the sample (2% or less). Interestingly, although the source areas for Pennsylvanian and Permian cherts are relatively close geographically (Figure 3), Pennsylvanian chert is minimally utilized at

14RP1. This same pattern has been observed at other Pawnee sites (Herman, Holen, and Peterson 1995:85; Holen 1983:64-65).

Since only 205/353 (58.1%) of the collection comes from house excavations, it was important to determine if there were selective factors taking place within houses at the site or excavation biases that may impact the representation of material types for the entire collection. All items from excavated houses were separated from artifacts found elsewhere on the site and the material types were compared (Figure 9).

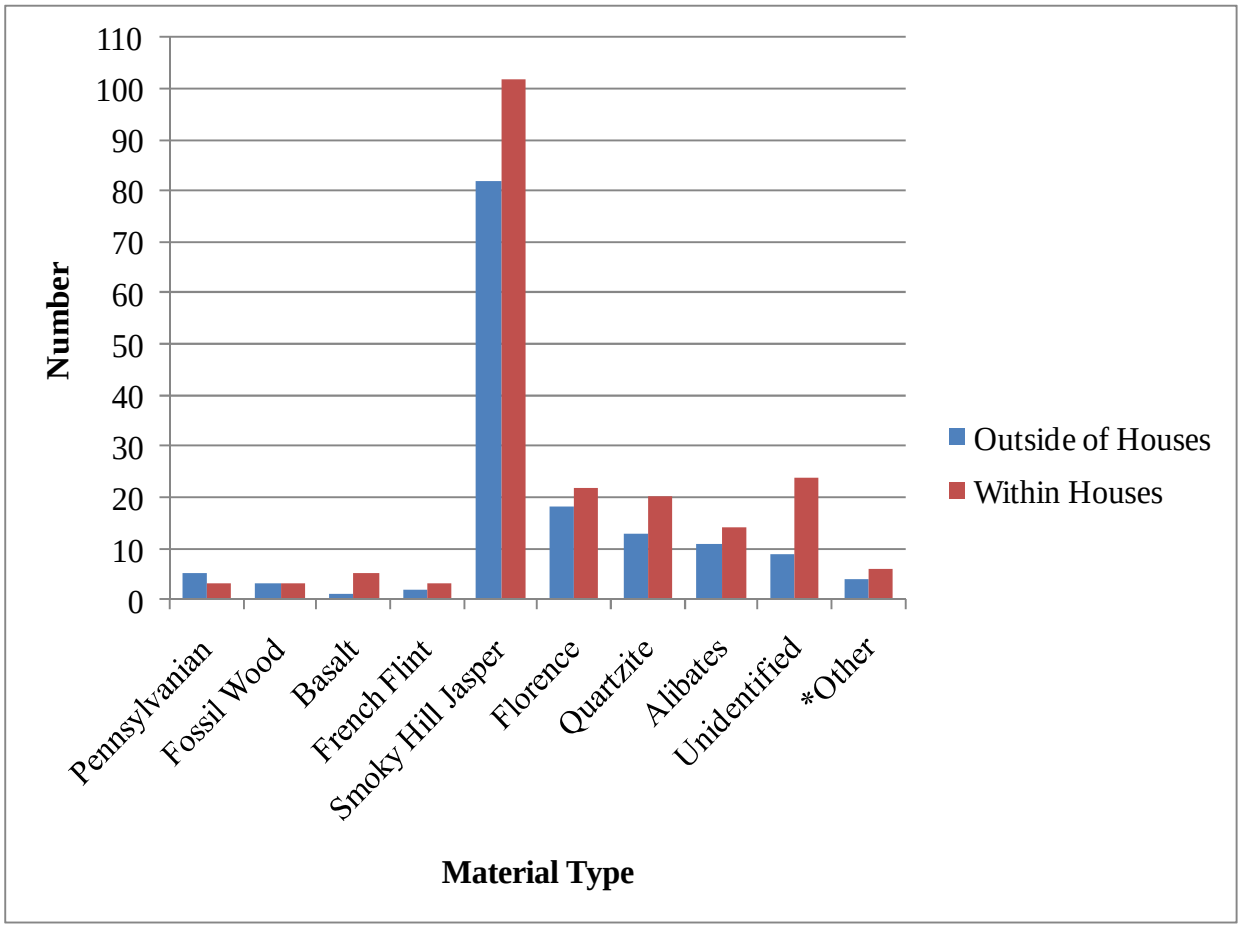

Figure 9: Comparison of Material Type Frequencies for Items Recovered Within Houses and Outside of Houses at 14RP1. (*Other Includes: Boone, Burlington Crescent, Chalcedony, European Indeterminate, and Obsidian).

It is apparent that there are no major differences in material types on average for items found within houses and items found outside houses. This suggests that there are no special selective factors taking place within houses as compared to the site as a whole in regards to material types; overall patterns of artifact disposal are similar inside and outside of lodges. To

Material Type	Within Houses		Outside of Houses		
	Raw	***Cum %***	***Raw***	***Cum %***	***Difference***
Smoky Hill Jasper	102	0.646	82	0.661	0.015
Alibates	14	0.735	11	0.749	0.014
Florence	22	0.874	18	0.894	0.02
Quartzite	20	1.00	13	1.00	0.00
Total	158		124		

H_0: There is no difference between the chipped stone material types found within and outside of houses at 14RP1.

H_1: There is a difference between the chipped stone material types found within and outside of houses at 14RP1.

0.01 Level: $1.63\sqrt{\frac{n1+n2}{n1n2}} = 1.63\sqrt{\frac{158+124}{158\,(124)}} = .1956$

D = Maximum deviation between pairwise comparisons = 0.02

Critical value of D at 0.01 Level = .1956

The observed value of D falls short of the critical value; the null hypothesis is not rejected. This experiment fails to show a significant difference between the chipped stone material types found within houses and those found outside of houses at 14RP1.

Figure 10: Kolmogorov-Smirnov Two-Sample Test for the Four Primary Chipped Stone Material Types found at 14RP1.

test these apparent visual similarities, a Kolmogorov-Smirnov two-sample test was carried out on the four primary material types found at 14RP1 (Figure 10). This proved that material type frequencies found outside and inside houses at 14RP1 are not significantly different.

Figure 8 does not take into account differences among houses. To determine if there are noticeable differences in material types between specific houses, material types from each individual house were compared (Figure 11, Table 1). This chart shows how materials are

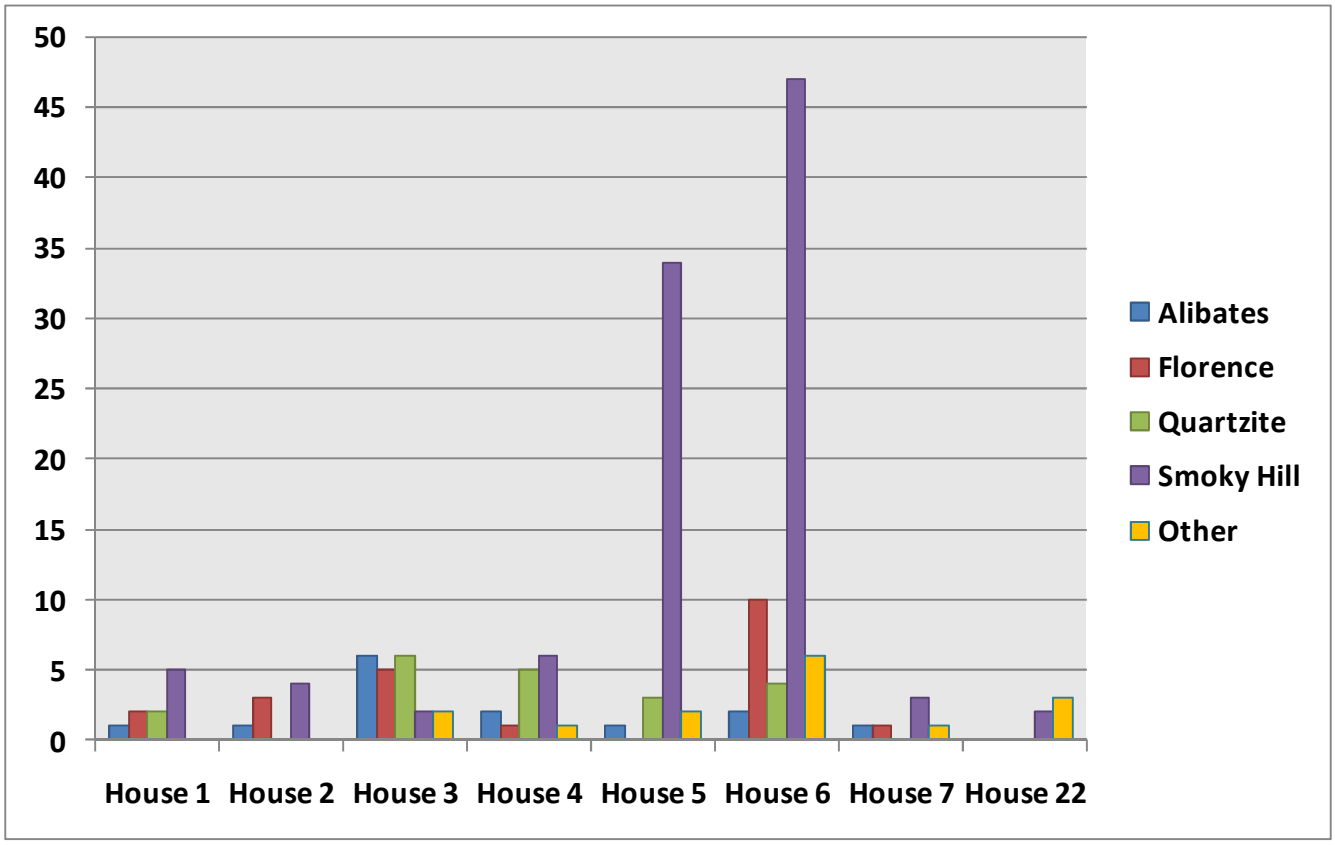

Figure 11: Distribution of Chipped Stone Material Types Among Houses at 14RP1.

distributed amongst individual houses. Two houses stand out, House 5 and House 6. Combined, these two houses yielded the majority of Smoky Hill jasper within the collection, not surprising since they also contain the most chipped stone materials overall. To a lesser extent, House 3 is unique in that it has relatively little Smoky Hill jasper, but peaks in Alibates, Florence, and

Quartzite. Obviously sample size may be influencing these observations. Houses 3, 5, and 6 will be considered in greater detail below.

Table 1: Chipped Stone Material Type Distributions at 14RP1.

Material Type	House 1	House 2	House 3	House 4	House 5	House 6	House 7	House 22	Outside Houses	Total
Alibates	1	1	6	2	1	2	1		11	25
Basalt			1	1			1	2	1	6
Boone					1					1
Burlington Crescent					1				2	3
Chalcedony						2			1	3
European Unidentified	2				1					3
French Flint			1		1	1	1		2	6
Florence	2	3	5	1		10	1		18	40
Fossil Wood						2		1	3	6
Obsidian									1	1
Pennsylvanian			1			2			5	8
Quartzite	2		6	5	3	4			13	33
Smoky Hill Jasper	5	4	2	6	34	47	3	2	82	185
Unidentified	1	2	2	1	8	9	1		9	33

Chipped and ground stone tools and associated debitage are the second most commonly occurring artifact types at Pawnee sites following ceramics (O'Shea 1989:76). Among chipped stone objects, endscrapers, bifacial knives, and unnotched triangular points are most commonly reported (Herman, Holen, and Peterson 1995:82). Also, Smoky Hill jasper and Permian cherts (Florence) are often cited as the two most frequently utilized material types at Pawnee sites (O'Shea 1989:77).

Holen (1991) suggests that lithic procurement was closely associated with patterns of semi-annual bison hunting and territoriality (Holen 1991:408; Hudson 1993:274; O'Shea 1989:77), stating that "seasonal bison hunting was the only subsistence activity which took the Pawnee any considerable distance from their permanent earthlodge villages" (Holen 1991:404).

Major lithic materials found at Pawnee sites corresponds to known outcrops that were regularly utilized while on hunting trips; geographical distance to source played only a minor role (Holen 1991:408; Hudson 1993:274; O'Shea 1989:77). When traditional Pawnee hunting grounds shifted, as they did for the South Bands with encroachment of the Kansa into northeastern Kansas in the late eighteenth century, intensity of lithic material utilization shifted as well (Holen 1991:408; Hudson 1993:274; O'Shea 1989:77). Also, the Pawnee were possibly spending more time out west hunting to facilitate the increased demand of trade. This change resulted in a transition from assemblages dominated by Permian cherts to materials further west, namely Smoky Hill jasper (Figure 12). Figure 12 is an expansion of the work of Hudson (1982:67) who used the Brainard-Robinson Coefficient of Similarity to demonstrate that sites most similar in age are also most similar to each other in composition of lithic materials.

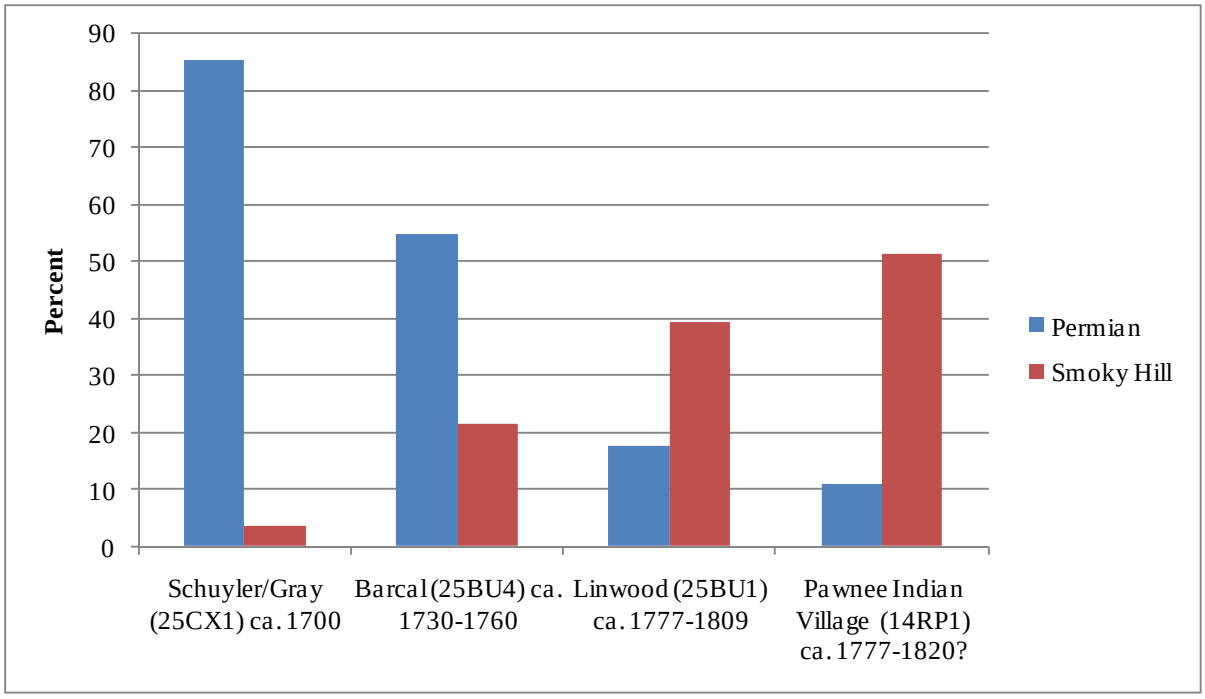

Figure 12: Change in Pawnee Lithic Procurement through Time (Adapted from Hudson [1982] and Holen [1991]).

As discussed in chapter 2, the Kitkahahki are not referred to in literature until 1775 and it is likely the Kawarahki were splitting into the three South Bands around this time. The lithic assemblage at 14RP1 is most similar to that of the Linwood site (25BU1), and these two sites are also the closest in age. Schuyler/Gray (25CX1) and Barcal (25BU4) are Lower Loup or protohistoric Pawnee sites, and are typically referred to as the ancestors of the historic Grand Band (Chawi) of Pawnee (Hudson 1982:42-47). Linwood, a historic Grand Band site with earlier Lower Loup components, falls within the transitional period between Lower Loup and historic Pawnee (Hudson 1982:46-47). Interestingly, Hyde (1951) suggests the Kitkahahki split from the Grand Band around 1776, or slightly earlier, and that by 1777 the Grand were living at the Linwood site (Hyde 1957:117). If this is true, and assuming that temporality and territoriality were closely linked, then lithic assemblages at the earliest Kitkahahki sites may be most similar to those observed at Linwood, which appears to be the case (Figure 12). If the South Bands had split apart earlier, the lithic assemblage observed at 14RP1 would likely be more similar to 25CX1 or 25BU4 than 25BU1.

However, the above assumption does not take into account slight differences in territoriality among the three South Bands. Also, factors other than territoriality were likely influencing lithic material acquisition. At the Stabaco site (25HW16), a Skiri village occupied ca. 1740-1750, it has been shown that tool function correlates closely with lithic material quality (Holen 1995:130-131). At this site, there is an apparent reduction in reliance on Smoky Hill jasper and an increase in Permian cherts (Holen 1995:132). Permian chert is less variable in quality and more durable than Smoky Hill jasper (Herman, Holen, and Peterson 1995:97). For this reason, people at Stabaco were selectively targeting and going to great lengths to acquire

Permian chert for the production of endscrapers for which a tougher or less brittle stone is preferred.

A comparison of endscraper and metal frequencies at 14RP1 and 25HW16 may explain the differences observed. At 25HW16, stone endscrapers comprise 56.9 percent of all chipped stone tools including retouched flakes (Herman, Holen, and Peterson 1995:99). These are primarily nicely-made, plano-convex endscrapers (Herman, Holen, and Peterson 1995:89). This style of endscraper is commonly found at protohistoric Pawnee Lower Loup phase sites, but rare in Historic sites (Herman, Holen, and Peterson 1995:89; Wedel 1936:76). The lower number of endscrapers at 14RP1 (Table 2) supports this assertion. Hudson (1982:24; 1993:275) mentions that stone implements used to perform daily chores, primarily basic utilitarian cutting and scraping implements, were the first to be replaced by introduced metal items (Herman, Holen, and Peterson 1995:99). Highly patterned artifacts without a ready European imitation (such as plano-convex endscrapers) were replaced next (Herman, Holen, and Peterson 1995:99). As metal became more readily available, less effort in procurement of lithic materials took place, resulting in "less well made tools from lower quality stone" (Herman, Holen, and Peterson 1995:99; Hudson 1993:275).

Table 2: Chipped Stone Scraper Material Types and Distributions at 14RP1.

Scraper Material	House 2	House 3	House 4	House 5	House 6	House 7	Outside Houses	**Total**
Alibates			1					1
Basalt		1						1
Burlington							1	1
Florence (Permian)	1	1			1	1		4
Pennsylvanian							1	1
Smoky Hill Jasper		1	2	1	1		5	10
Total	1	3	3	1	2	1	6	18

At the Stabaco site, there is an absence of metal scrapers, indicating that "utilitarian artifacts used to perform daily chores were not necessarily the first to be replaced, except, perhaps, when a ready metal substitute was available" (Herman, Holen, and Peterson 1995:99). The lack of metal scrapers at Stabaco can partially be explained by differential preservation qualities of metal materials as well as "other factors such as the form of Euroamerican trade and properties of various alloys as to how they can be reworked by native peoples", or the fact that trade was not yet fully developed (Herman, Holen, and Peterson 1995:99). At Stabaco, the chipped stone assemblage suggests hunting in South Bands territories, or increased interaction and redundant trade between the South Bands and Skiri to obtain high quality lithic materials for specialized purposes (Holen 1995:131).

Permian patterned tools are mostly in the form of endscrapers (83.5%), compared to only 36.2 percent of Smoky Hill jasper patterned tools at the Stabaco site (Holen 1995:130). In contrast, 14RP1 has a higher percentage of Euroamerican and Native-made metal scraping implements (Table 5), indicating more exposure and access or familiarity with Euroamerican metal items. It is likely that iron artifacts are underrepresented in this collection due to preservation factors as well. The low number of chipped stone endscrapers and relatively high percentage of metal counterparts indicates that 14RP1 was further in the technological replacement process than 25HW16, resulting in less dependence on higher quality lithic materials for scraping tools.

Although Permian cherts are more likely to occur as patterned tools than Smoky Hill jasper (Figure 13), only 5/40 (12.5 %) of all Permian (Table 3) occurs as scrapers, and only 5/27 (18.5%) of all Permian patterned tools are endscrapers. Even though only 10/185 (5.4%) of all

Smoky Hill jasper occurs as scrapers, when only patterned tools are considered this number jumps to 10/62 (16.1%). This indicates that for the available sample from14RP1, the probability

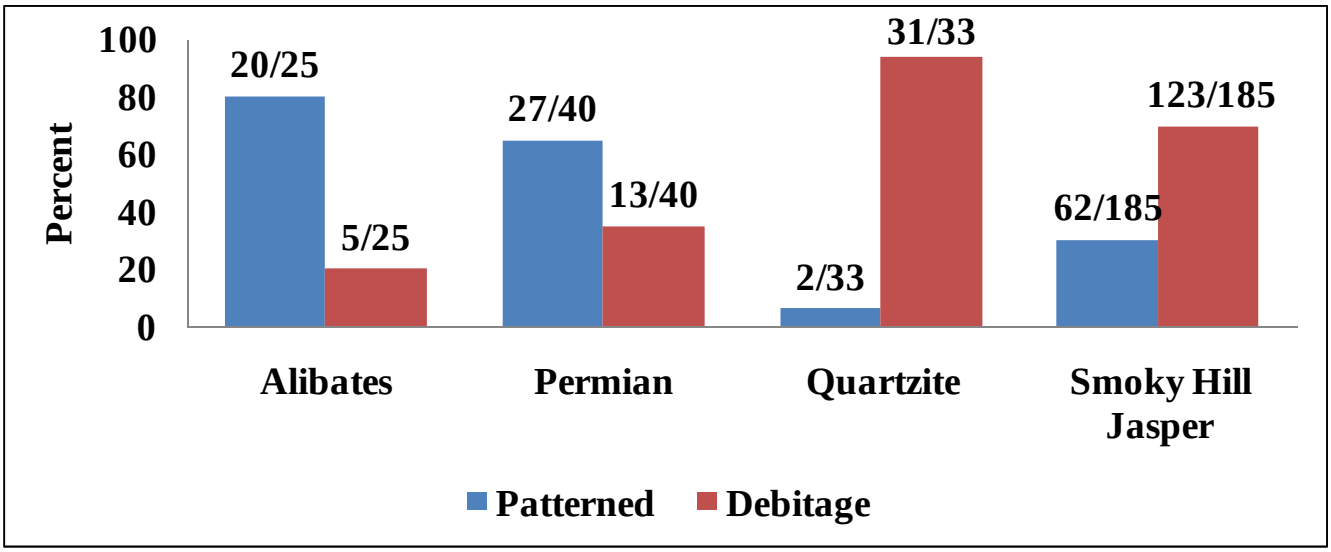

Figure 13: Comparison of Chipped Stone Patterned Tools vs. Debitage at 14RP1.

of scrapers produced out of Smoky Hill jasper and Permian chert are almost identical, suggesting that material quality played only a minor role in scraper production at 14RP1. Therefore, hunting territoriality as well as access to metal, not lithic quality likely played a greater role in determining the material types and functionality observed at 14RP1.

Table 3: Comparison of Tool Type and Material Frequencies at 14RP1.

Material Type	Arrow Point	Biface	Debitage	Gunflint	Knife	Retouched Flake	Scraper	Strike-a-light	Other
Alibates	1 (4.0%)	2 (8.0%)	5 (20%)	7 (28.0%)	0	5 (20.0%)	1 (4.0%)	3 (12.0%)	1 (4.0%)
Florence	4 (10.0%)	5 (12.5%)	13 (32.5%)	7 (17.5%)	0	3 (7.5%)	5 (12.5%)	1 (2.5%)	2(5.0%)
Quartzite	0	1 (3.0%)	31 (95.0%)	0	0	0	0	0	1 (3.0%)
Smoky Hill	5 (2.7%)	6 (3.2%)	123 (66.5%)	7 (3.8%)	5 (2.7%)	24 (13.0%)	10 (5.4%)	1 (0.5%)	4 (2.2%)

Other patterns are observable when artifact types are compared to material types (Table 3). Alibates is most likely to occur as gunflints and strike-a-light flints, which make up forty percent of all Alibates and fifty percent of Alibates patterned tools (when debitage is excluded).

Florence has relatively similar representations of arrow points, bifaces, gunflints, and scrapers indicating that Florence is not being selectively used for a single tool type unlike the pattern observed at Stabaco. Quartzite occurs primarily as debitage. This is because the majority of quartzite at the site is in the form of flakes detached either through use reshaping or thermal alteration from ground stone tools. Quartzites do not appear to be targeted as a material type for chipped stone production. Rather, they are incorporated into the collection only as a byproduct of ground stone tool production, often in the form of large discoidal "chopper-scraper" hide processors, or what Wedel (1936:76) and Strong (1935:60) called rubbing stones. Similarly, at other Pawnee sites including Gray, Burkett, and Stabaco, Ogallala quartzites are used only in the production of larger, cruder tools, namely rubbing stones (Herman, Holen, and Peterson 1995:98; Holen 1991:401; Stein 2006:278; Wedel 1986b:31). This is because of the knappability of coarse-grained quartzites; they split between grains rather than conchoidally and are not conducive to fine flaking.

Rubbing stones were not included as a part of the chipped stone analysis at 14RP1 or 25WT1 for a number of reasons. First, not all rubbing stones appear to have been chipped on the edges. Second, the rubbing stones that were chipped often were minimally so. Third, it appears they were used primarily as ground stone tools rather than chipped stone tools, evidenced by the smoothing on one or both faces, often obscuring any evidence of flaking or edge modification.

Smoky Hill jasper is relatively evenly distributed among arrow points, bifaces, gunflints, knives, and scrapers. Obviously, sample size limitations may be obscuring similar observations for other material types. However, the high number of debitage and retouched flakes compared to other material types suggests Smoky Hill jasper was more readily available than the other

materials. Also, the technique of bifacial reduction often associated with this material type creates more debitage than other techniques of core reduction (Holen 1995:129).

Roper (1989:250) suggests that material utilization was more complex than can be accounted for by a single model, such as Holen's embedded procurement conducted concurrently with bison hunting (Roper, ed. 1989:250). Roper agrees that preference may be exhibited among some source areas, similar to the patterns observed at Stabaco with the procurement of Permian cherts (Roper, ed. 1989:250; Holen 1995:131). She suggests it is the minor material types that appear to have been selectively utilized (Roper, ed. 1989:250). Although at 14RP1 Permian cherts appear to have not been selectively targeted or utilized for special purposes, Permian chert is still more likely to occur in the form of patterned tools. Alibates, an even more exotic material, appears to have a very specialized usage, and likewise is the most likely material type to appear as patterned tools (Figure 13). This supports Roper's assertion that "what may be reflected is the routine use of the predominant raw material whenever the need arose for tool manufacture, and use of other raw materials, when they were available for specific tool types" (Roper, ed. 1989:250). Expanding Roper's work, I suggest that other relatively minor materials may have limited (and specialized) tool functionality because they are being traded into or brought to the site in predetermined form, such as appears to be the case with Alibates gunflints at 14RP1. This perhaps indicates trade interactions with the Wichita or other groups to the south and southwest of the Kitkahahki homeland. This idea is elaborated further later.

Since representations of Smoky Hill jasper and Permian cherts appear to change predictably through time, although at an unknown rate, it is possible to compare material distributions among specific houses and suggest relative chronological positions. The three houses (3, 5, and 6) that stood out in material distributions (Figure 11) are compared below

(Table 4). House 5 has the most Smoky Hill jasper and no Permian chert (Florence), followed by House 6 with slightly less Smoky Hill jasper and a small representation of Florence. However, House 3 is unique in that it has the lowest percentage of Smoky Hill jasper and the highest percentage of Florence and Alibates.

Table 4: Material Type Comparisons for Houses 3, 5, and 6 at 14RP1.

Material Type	**House 3** (Total = 24)	**House 5** (Total = 50)	**House 6** (Total = 79)
Alibates	6/24 (25.0%)	1/50 (2.0%)	2/79 (2.5%)
Florence	5/24 (20.8%)	0/50 (0%)	10/79 (12.7%)
Quartzite	6/24 (25.0%)	3/50 (6.0%)	4/79 (5.1%)
Smoky Hill Jasper	2/24 (8.3%)	34/50 (68.0%)	47/79 (59.5%)

Based on the previous model (Figure 12), it is suggested that House 3 represents an older occupation than houses 5 and 6; however, an external chronological control is still needed. On the other hand, temporal assessment is only one factor and several factors that are not accounted for here are possibly involved, including the nature of lodge abandonment, but probably most importantly small sample size. Also, access to European goods, which is likely correlated closely to family status and lodge size, may be influencing chipped stone distributions even within contemporaneous houses. Even with limited sample size, a chi-square analysis test revealed that the observed patterns are likely not attributed to chance, but equifinality does not allow for determinations of why on the basis of information currently available. Distributions of chipped stone items and metal items from within houses are briefly discussed below, followed by discussions of select chipped stone artifacts.

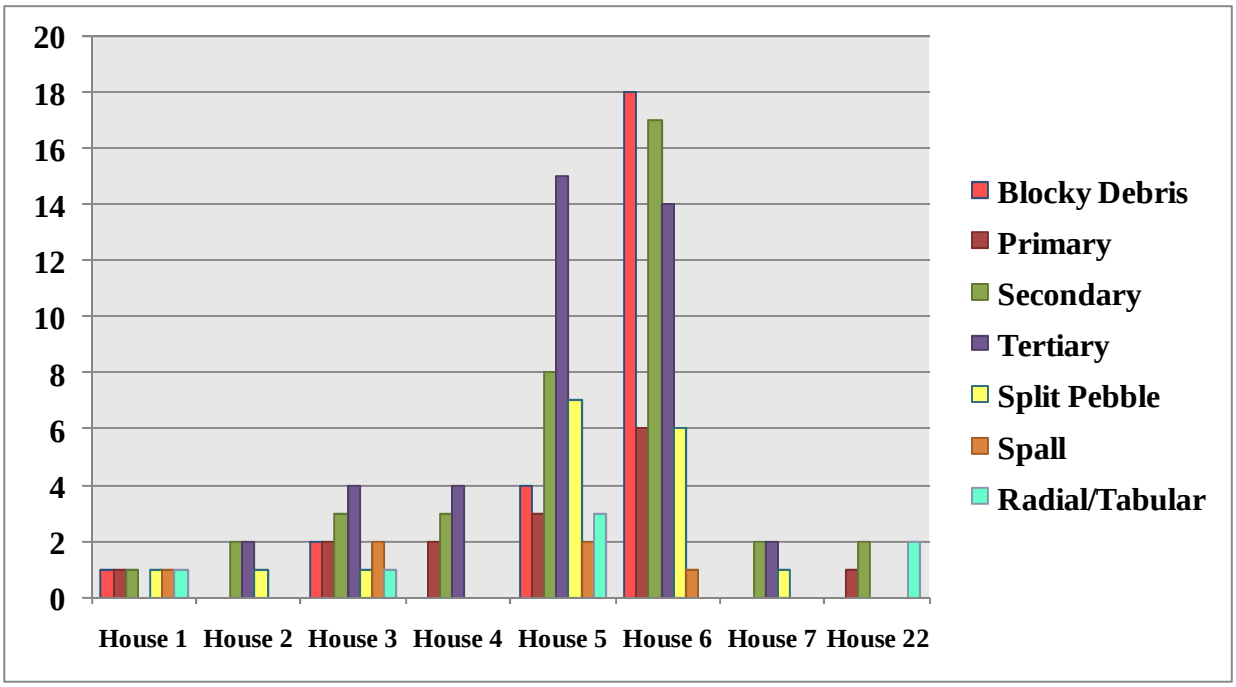

Figure 14: Distribution of Chipped Stone Debitage Among Houses at 14RP1.

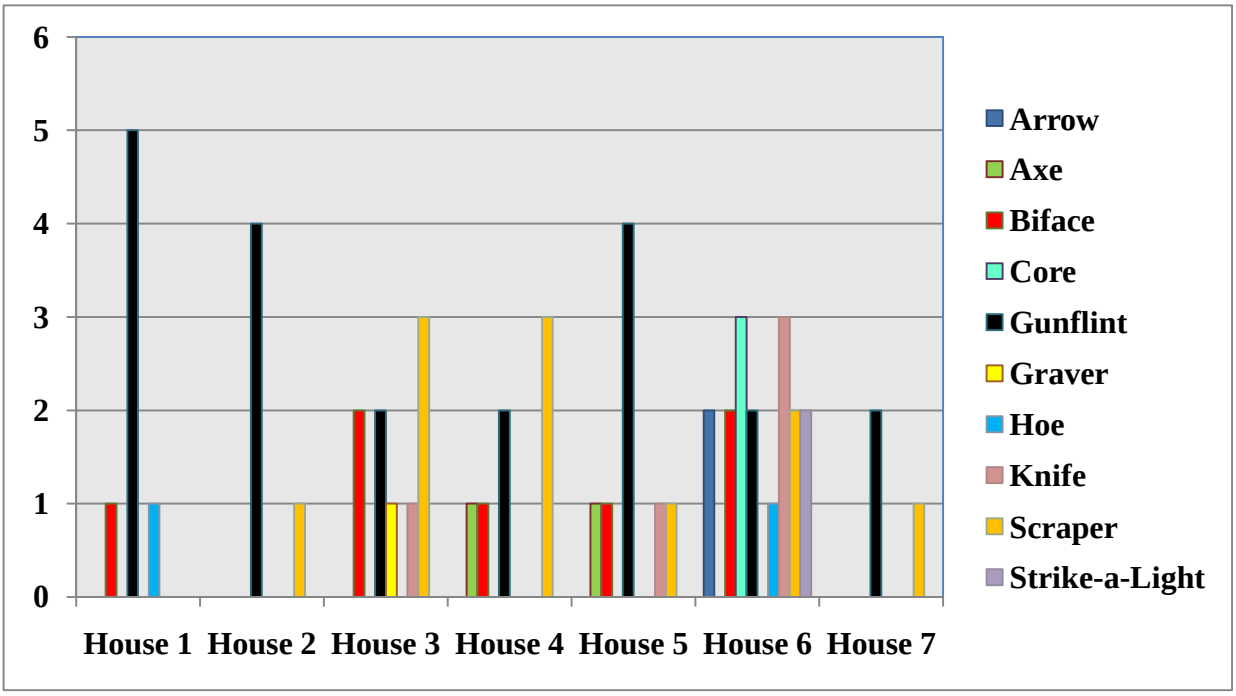

Figure 15: Distribution of Chipped Stone Patterned Tools Among Houses at 14RP1.

Figures 14 and 15 show chipped stone distributions from within all house

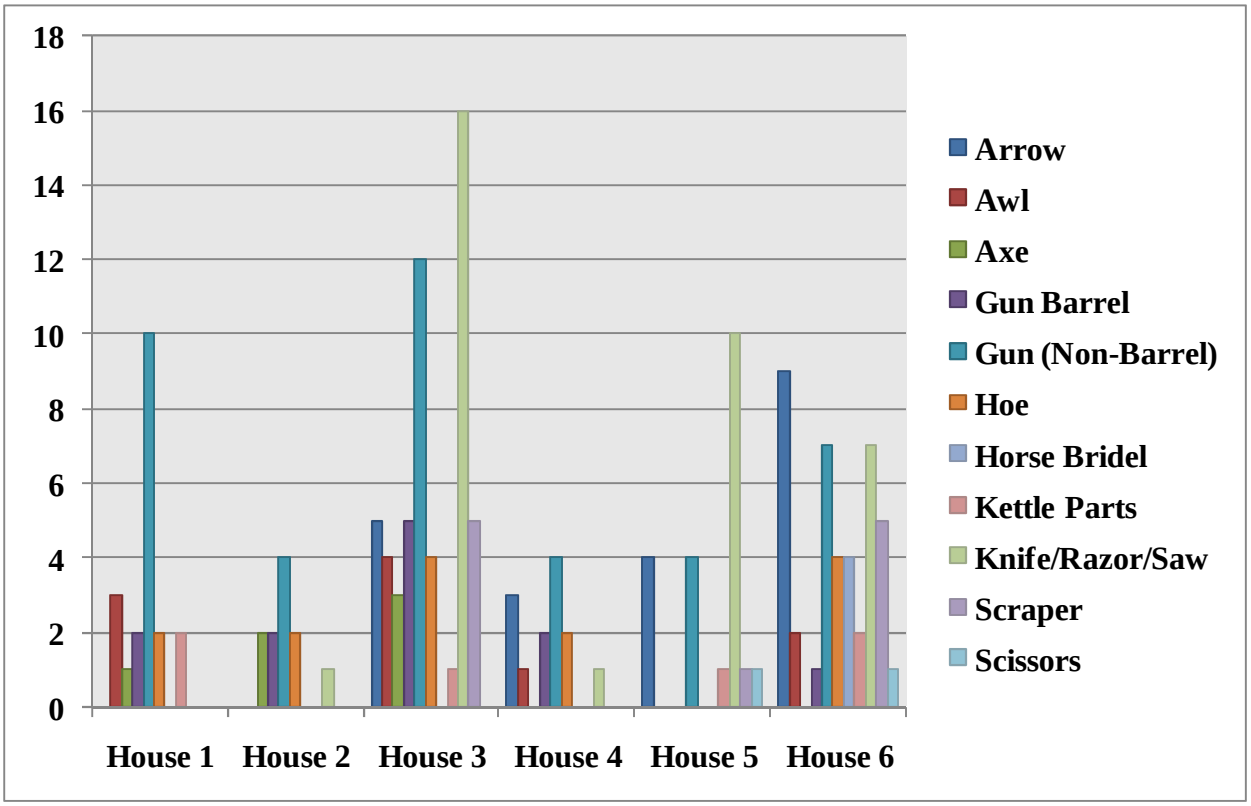

Figure 16: Distribution of Select Metal Artifacts Among Houses at 14RP1.

excavations. Several patterns can be observed. Primary, secondary, and tertiary flakes are the most likely chipped stone form to occur in all houses. Houses 3 and 4 have the most scrapers, and Houses 1 and 22 have none. Every house except House 22 has at least two gunflints present, with Houses 1, 2 and 5 having the most. The relatively high number of gunflints in the two houses excavated in 1949 (Houses 1 and 2) may have inspired Carlyle Smith's interest in gunflint research, or less likely, his interest in gunflints led to recovery biases. It is intriguing that he excavated the two houses that have the most gunflints. At the same time, it is evident that distributions of many materials among houses are relatively uneven. House 6 is unique in that it has the most blocky debris (primarily small tabular fragments of Smoky Hill jasper with little modification), it has the most chipped stone knives (n=3), and is the only house with chipped stone arrow points, cores, and strike-a-light flints.

House 6 also has the highest number of metal arrow points (Figure 16). Arrow points represent a problematic category at 14RP1 because most chipped stone points recovered stylistically predate the Pawnee occupation, but were possibly introduced to the site by the Pawnee. Only nine chipped stone arrow points were found at 14RP1, and only two of these can be attributed to Pawnee manufacture on stylistic grounds (Figure 17, Table 5). The first of these resembles the base of a small, thin triangular unnotched arrow point often common in protohistoric Pawnee sites (Dunlevy 1936:194; Herman, Holen, and Peterson 1995:94, Roper, ed. 1989:209-216; Wedel 1936:75). The second is a small side-notched arrow point typical of later Pawnee sites (Herman, Holen, and Peterson 1995:94; Wedel 1936:75). Both are shown in the top left of Figure 13. In addition, the introduction of the flintlock musket helps to supplant the bow and arrow, but only after these trade items became reliable and abundant. The high

Figure 17: Chipped Stone Arrow Points and a Selection of Differential Metal Arrow Points from 14RP1.

representation of gunflints from 14RP1 (n=38), which will be discussed towards the end of this chapter, indicates the Kitkahahki at 14RP1 were familiar with the flintlock musket.

The large number of metal arrow points (n=29) also supports the evidence that 14RP1 is well into the technological replacement process with European materials. Comparing the ratios of the three primary chipped stone tool types with their metal counterparts (Table 5), and assuming the rate of replacement corresponds closely with passage of time and/or availability of European substitutes, it may be possible to determine the order of replacement at 14RP1. Based on ratios alone, it appears that arrow points and knives are replaced first, followed by scrapers.

This continuum of replacement is similar to the pattern observed at other Pawnee sites, including the Barcal, Linwood, Schuyler, and Stabaco sites. Since arrow points and knives have simplistic functions, namely piercing and cutting, Hudson (1982:24; 1993:275) suggests these tools would have been the first to be replaced with ready-made Euroamerican substitutes. In other words, a metal replacement would have been produced early in trade relations whereas highly patterned chipped stone tools that served a more complex function (e.g. plano-convex endscrapers) would not immediately have had a metal replacement and therefore would be

Table 5: Chipped Stone vs. Metal Ratios at 14RP1 for Arrow Points, Knives, and Scrapers.

Tool Type	Material	Minimum Number	Ratio (Chipped Stone: Metal)
Arrow Point	Metal Chipped Stone	29 2	1:14.5
Knife	Metal Chipped Stone	42 6	1:7
Scraper	Metal Chipped Stone	18 18	1:1

replaced later in time (Herman, Holen, and Peterson 1995:99). Also, since these tools are utilized in daily domestic chores may have accelerated the replacement process (Herman, Holen, and Peterson 1995:99; Hudson 1982:24; 1993:275).

Chipped stone knives may be underrepresented because unmodified and retouched flakes as well as other tools can conceivably serve as cutting implements (Herman, Holen, and Peterson 1995:100). However, metal knives may also be underrepresented due to differential preservation. The fact that knives are primarily made out of Smoky Hill jasper (Table 3), the most commonly occurring and readily available material type, may indicate chipped stone knives were quickly becoming obsolete. This can perhaps be explained by the fact that higher quality Euroamerican metal knives were readily available; expedient chipped stone knives were only produced out of materials that were the most common and perhaps considered less valuable.

Although the sample size of artifacts from 14RP1 is limited and differential preservation is likely influencing the collection, a few minor patterns in metal distribution can be noted. Figure 16 displays the distribution of select metal items among all houses. House 1 has the most metal miscellaneous gun parts corresponding to the higher number of gunflints in this house. House 3 has the richest distribution of metal

Figure 18: 2008 Excavation of House 13 at 14RP1.

overall, including the most gun barrels and native made "squash knives" (sheet brass/copper strips with one end serrated). This is interesting considering House 3 also has different chipped stone materials (Table 4) and could represent an earlier occupation. Factors such as differential status and nature of lodge abandonment may also come into play here. The general lack of metal items from Houses 21, 22, 24, and 25 may be partially explained by excavation limitations. However, it is apparent that the distribution of chipped stone artifacts and their metal counterparts pattern out relatively random among houses at 14RP1.

A portion of House 13 was excavated by the University of Kansas Archaeological Field School, the Kansas State Historical Society, and the Kansas Anthropological Association's Kansas Archaeological Training Program (KATP), during the summer of 2008 (Figure 18). Materials recovered during these excavations are considered independently for several reasons. First, only a portion of the lodge was excavated so the artifacts recovered represent only a sample of the artifacts from within the house. Second, the excavations in 2008 were the first time ¼" and 1/16" water screening were employed, as well as the first time flotation samples were taken from each unit. This resulted in greater recovery of small scale artifacts than in previous excavations. Of all chipped stone recovered from House 13, 96.0 percent was found during screening (Table 6). A total of 404 chipped stone items were recovered as of April 28th, 2009, which is 51 more than all previous excavations combined, and all from only a portion of a single lodge excavation (Figure 19).

Table 6: Efficiencies of Different Recovery Techniques.

Recovery Method	Number and Percentage
1/16" Fill Water screen and Flotation	n=317, 78.5%
1/4" Overburden Dry screen and Fill Water screen	n=71, 17.6%
Piece Plot (Mapped)	n=16, 4.0%
Total	n=404, 100%

The small size of flakes recovered from 1/16" water screen and flotation drastically reduced abilities to make accurate material assessments. The high variability of quality, color, texture, and inclusions for individual material types are almost impossible to account for accurately on flakes whose average maximum length was less than 6 mm (Table 7). Material assessments for ¼" are likely more accurate than for the smaller flakes recovered from 1/16" screening. These items fall within the category of what Muntz (2002:319-320) termed small-sized debitage.

Small sized-debitage normally measures in maximum dimensions between 2.0 mm and 50 mm (Muntz 2002:319). Although some items fall below this size range, they are too large to be considered microdebitage, which is defined as anything less than 1.0 mm in maximum

Table 7: Flake Size Dimensions for Different Recovery Methods.

1/16" Water Screen and Flotation (n=317)				
	Length	**Width**	**Thickness**	**Weight**
Average	5.60	4.02	1.06	0.02
Minimum	1.5	1	0.2	>0.01
Maximum	14	10	7	0.51
¼" Water Screen (n=71)				
	Length	**Width**	**Thickness**	**Weight**
Average	11.61	8.71	2.73	0.33
Minimum	5.1	0.7	0.7	0.02
Maximum	25.3	21.4	7.9	2.57
Piece Plot (Mapped) Items (n=16)				
	Length	Width	Thickness	Weight
Average	27.2	19.03	5.87	4.01
Minimum	16.3	11.8	2.4	0.47
Maximum	52	34.1	13.8	20.15

dimension (Fladmark 1982:205; Muntz 2002:319). The largest item from 1/16" recovery falls within the small-size debitage range, but it is too large to have passed through the ¼" screen. This item may represent a case of mislabeling in the field or laboratory, or an item that passed

through the screen at an angle. Materials recovered from ¼" screen also fall within the small-size debitage range. These items are approximately twice the size of the flakes recovered from 1/16" on average.

Material type frequencies and percentages for items recovered from House 13 are shown in Figure 20. The four primary material types found in House 13 (Smoky Hill jasper, Florence, Quartzite, and Alibates) occur in a similar order of predominance as all material types found at the site from previous excavations (Figure 8). This reaffirms the suggestion in earlier that material type frequencies found outside and inside houses are not significantly different. In addition, it demonstrates that the frequencies of material types for small-size debitage correlate well with material type frequencies for larger items. It also shows that Smoky Hill jasper, Florence, Quartzite, and Alibates are consistently the most likely materials to be represented at the site.

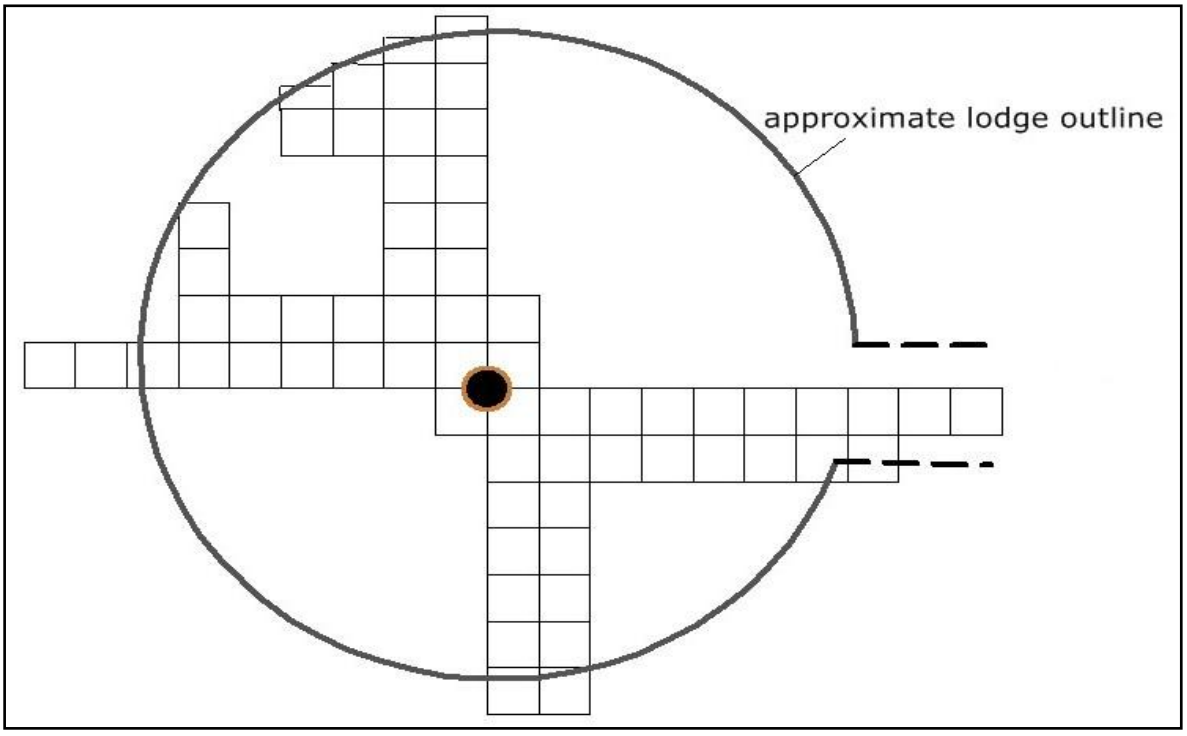

Figure 19: Outline of House 13 Showing Units Excavated in 2008.

One difference between the small-size debitage material types from House 13 and the material types observed from all previous excavations is that Smoky Hill jasper is better represented in the small size debitage. Several explanations are put forth for this observation. First, the wide range of variation of colors that are shared between Smoky Hill jasper and other material types could have led to a small percentage of pieces being misidentified as Smoky Hill jasper. Second, as mentioned earlier, biface reduction, of which Smoky Hill jasper is closely linked, produces more debitage than other methods of reduction. The comparison of patterned tools vs. debitage (Figure 13) for Smoky Hill jasper confirms this suspicion. Also, Smoky Hill jasper is a closer source than other material types, perhaps contributing to the greater representation of this material type at the site.

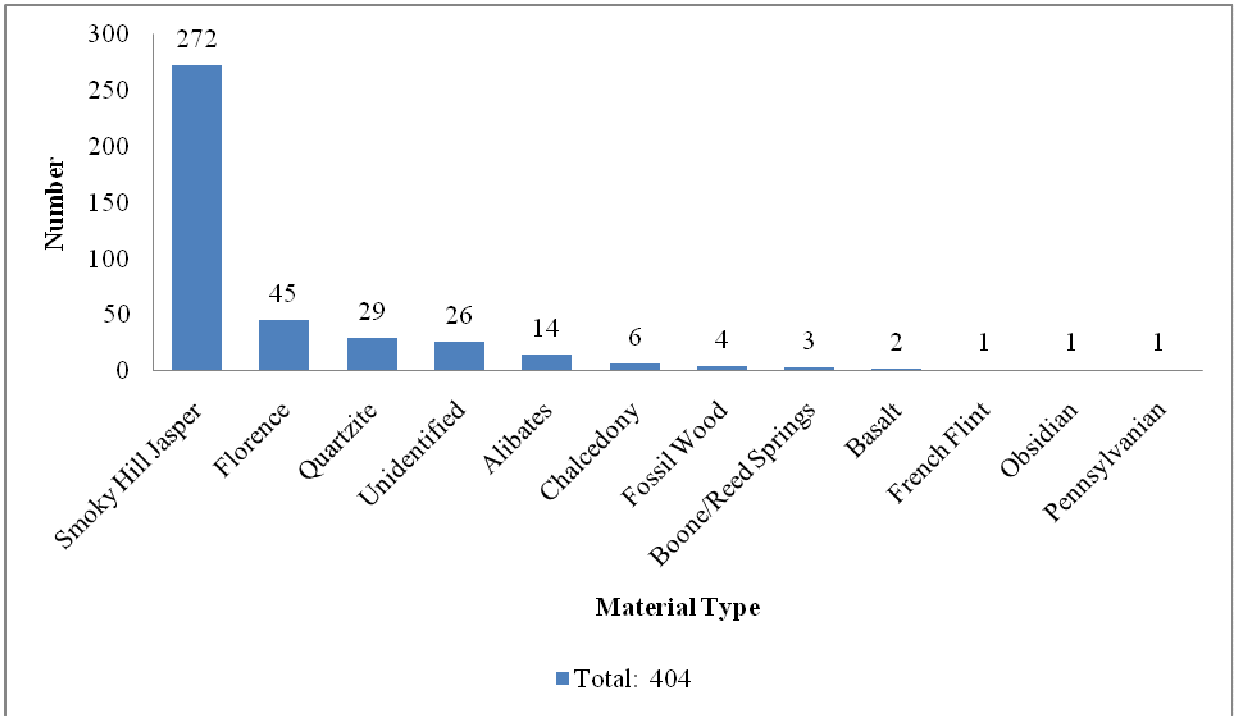

Figure 20: Chipped Stone Material Type Frequencies for House 13 at 14RP1.

The completion of the excavation of House 13 is critical for a study of small-scale debitage spatial distributions within a Pawnee earthlodge. No such study has ever been

undertaken. Also, comparing materials found on the roof of the lodge with those found on the floor may shed light on special activity areas. In most instances, inside the lodge was considered the property of the women, and the men were relegated to the roof. This cultural factor may be at play here. It is proposed here that the majority of knapping activities took place outside of the lodge to eliminate sharp waste flakes from being incorporated into the living area. If chipped stone tool manufacture did take place within the lodge, it is likely that such activities took place on hides or mats that could be removed and the debitage disposed of in a less trafficked area. Also, routine sweeping and cleaning of the lodge floor would potentially distribute any flakes on the living surface to the perimeter of the lodge, around support poles, or outside the entryway. Therefore, it is suggested that there likely will not be a high quantity of chipped stone debitage materials on the living surface of the lodge. However, other factors including the nature of planned and unplanned lodge abandonment influence this.

Debitage that is more likely to be on the floor of the lodge is potentially associated with daily domestic chores and tool retouch related to the chipped stone tools utilized to perform these activities. The majority of the small-size debitage from House 13 appear to be small biface thinning or tool retouch flakes. However, Hudson (1982) has demonstrated that chipped stone tools utilized in daily domestic chores were the first to be replaced with European metal substitutes, which in turn would decrease the amount of associated debitage.

Another flake type that is expected from within a house occupation context is strike-a-light flint flakes. Strike-a-light flints would have been utilized to light the centrally located hearth. Therefore, it is expected that flakes from strike-a-light flints may be found in this vicinity of the lodge. No studies have been undertaken that describe what a strike-a-light flake looks like, so all flakes labeled as such in my analysis are based purely on speculation. These

flakes are generally square in shape with a snap or step termination and exhibit heavily battered platforms. Debitage from gunflints and strike-a-light flints likely look very similar and distinguishing between the two accurately is difficult. However, it is likely that the Pawnee were not routinely firing guns within their lodges so flakes resembling either gunflint flakes or strike-a-light flakes found within this context are likely a product of the latter. To accurately assess this, strict control is needed in separating materials associated with activities that took place on the roof of the lodge and those that took place on the floor. These assemblages should be different; gun fire was likely more common outside of the lodge whereas strike-a-light use is expected to be more common on the floor. Experimental archaeology and microscopic analysis are needed to distinguish between these two similar flake types.

25WT1 Chipped Stone

A total of 142 chipped stone artifacts and pieces of debitage from the Hill site (25WT1) are available for study. The small size of the assemblage quickly calls into question the completeness of the collection. Represented is likely only a small portion of what has been found at the site. Nevertheless, similar to 14RP1, Smoky Hill jasper dominates the collection (n=83; 58.4%), followed by Alibates (n=13; 9.2%), European flint, likely Brandon (n=8; 5.6%), and Florence (n=6; 4.2%). All other material types are represented by five or fewer objects each. Lack of provenience documentation eliminated any possibilities of intra-site comparisons or distribution analysis. Most items were recorded as *village site* and individual house designations are rare (Appendix).The percentages of debitage to patterned tools for Alibates, Permian, Quartzite, and Smoky Hill jasper suggest that selective collecting was taking place (Figure 22). It appears that primarily tools were collected and not associated debitage. The sample likely represents a larger site collected over a greater amount of time than 14RP1. The village area of

the site has been under cultivation since 1872, and surface collecting was a frequent activity in the past (Hill 1927:163).

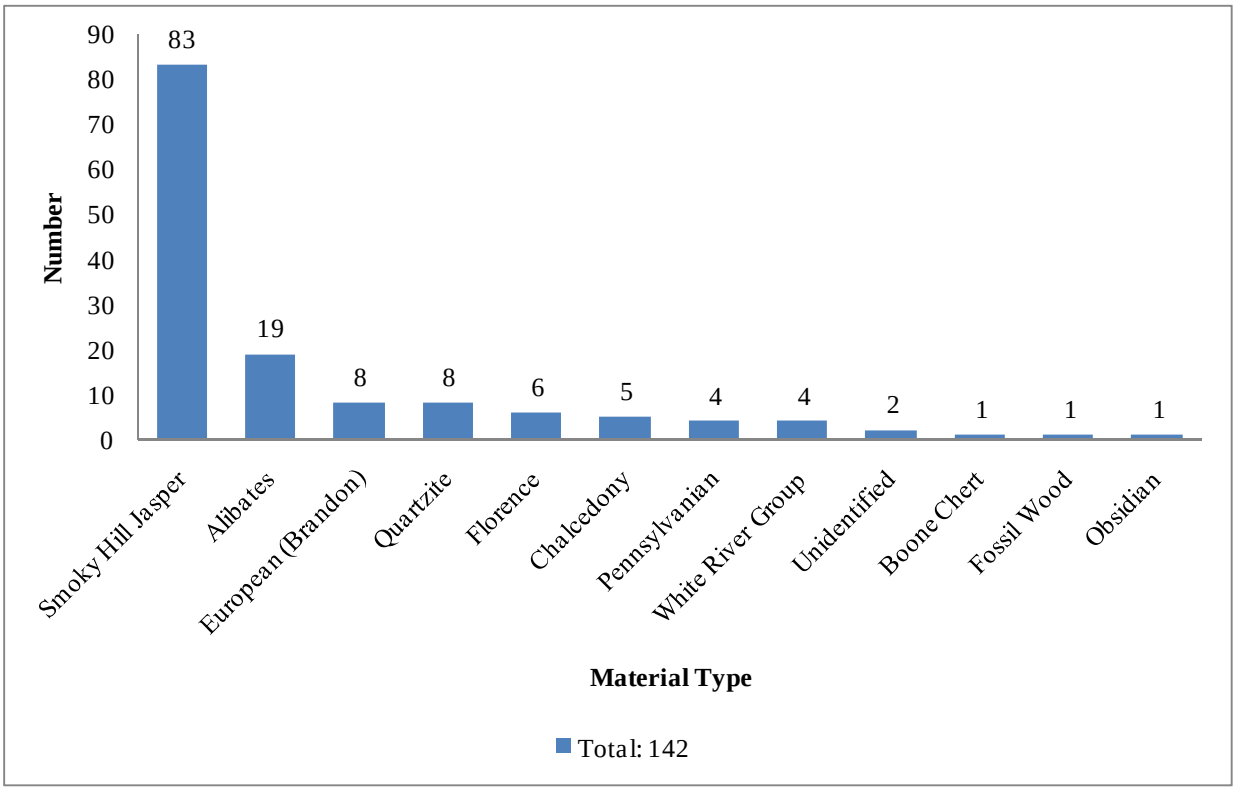

Figure 21: Chipped Stone Material Type Frequencies at 25WT1.

Similar to 14RP1, the scraper is most common chipped stone tool at the Hill site (Table 8). The large number of scrapers made of Smoky Hill jasper (n=33) is interesting. Although the sample is probably flawed from selective collecting, it is likely that the Hill site was well into the replacement process with European substitutes. As has been suggested earlier with the 14RP1

Table 8: Comparison of Tool Type and Material Frequencies at 25WT1.

Material Type	Arrow Point	Biface	Debitage	Gunflint	Knife	Retouched Flake	Scraper	Strike-a-light	Other
Alibates	0	0	1 (5.3%)	4 (21.1%)	1 (5.3%)	4 (21.1%)	2 (10.5%)	7 (36.8%)	0
Florence	2 (33.3%)	0	0	1 (16.7%)	0	0	3 (50.0%)	0	0
Quartzite	0	0	0	0	0	4 (50.0%)	4 (50.0%)	0	0
Smoky Hill	3 (3.6%)	4 (4.8%)	9 (10.8%)	3 (3.6%)	9 (10.8%)	13 (15.7%)	33 (39.8%)	5 (6.0%)	4 (4.8%)

collection, an increase in metal counterparts would decrease the need for a high quality lithic material for the production of scrapers. This would result in a higher number of scrapers manufactured out of poorer quality, more readily available stone, such as Smoky Hill jasper. The high number of scrapers produced of Smoky Hill jasper at the Hill site may support this assertion. Also, gunflints and strike-a-light flints make up 61.1 percent of Alibates patterned tools, again suggesting specialized usage for this material type similar to the pattern observed at 14RP1.

Since the chipped stone sample available for analysis from 25WT1 appears to be exceedingly limited, the most useful comparisons with 14RP1 concern unique material types and differential tool manufacture between the two sites. Two considerable differences between the 25WT1 collection and the 14RP1 collection are discussed below.

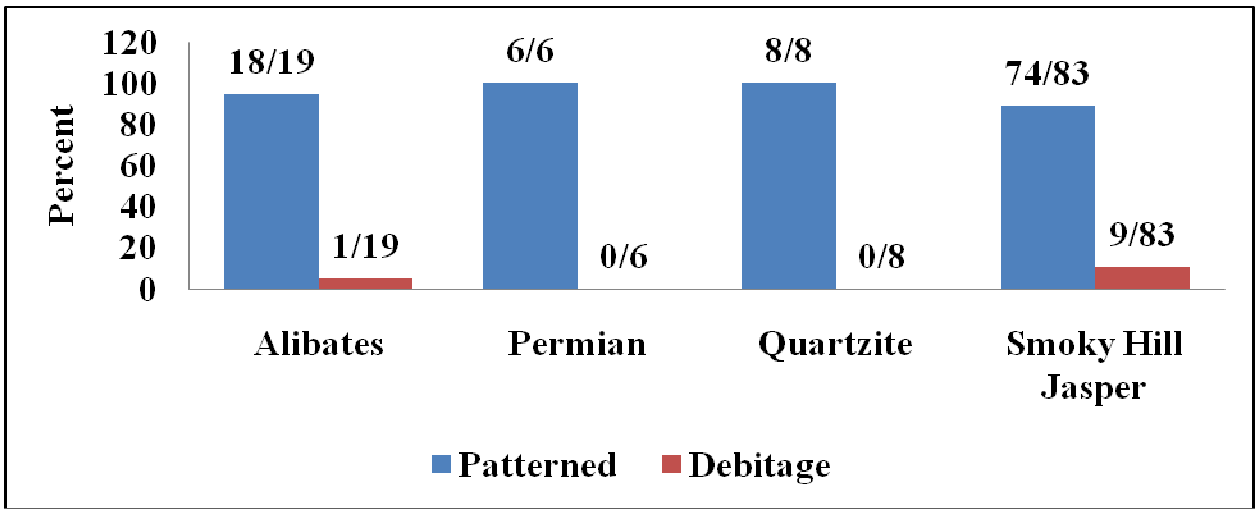

Figure 22: Comparison of Chipped Stone Patterned Tools vs. Debitage at 25WT1.

The first difference between the two collections is the representation of differing lithic material types, namely an appearance of White River Group silicates at 25WT1, including Flattop Chalcedony, and an apparent lack of Sioux quartzite. At 14RP1, Sioux quartzite constitutes 48.5 percent (n=15) of all quartzites and White River Group silicates were absent.

Holen (1995:130) has suggested based on archaeological and ethnographic evidence that the presence of White River Group silicates at the Stabaco site may indicate interactions with groups to the northwest of the core Pawnee territory, specifically the Arikara along the Missouri River in South Dakota. Although Stabaco was an earlier occupation, it is possible the presence of White River Group silicates at the Hill site indicates interaction with the Skiri to obtain resources from outside their own territories. The Hill site is also closer to the Skiri hunting territories than is14RP1 (Figure 1) perhaps leading to greater contact between the two. Holen (1995:130-131) mentions the Skiri may have served as middlemen between the French and Arikara, and that the Arikara may have traded White River Group silicates. If this is true, then South Bands groups could have potentially obtained lithic materials from Arikara territories through interaction with the Skiri. Alternative explanations are that occasional long-range bison hunting trips took the Kitkahahki into these territories, or that they were collecting White River Group silicates from localized out-washed river gravels.

The apparent absence of Sioux quartzite suggests that the occupants at the Hill site were not visiting the areas where Sioux quartzite is found, including the glacial tills of northeastern Kansas. These areas were likely not in the Kitkahahki hunting territories at the time, and as was demonstrated earlier, primary areas of South Bands lithic material acquisition appear to shift farther to the west through time in accord with the change in bison hunting territories. Holen (1995:131) suggests the Kansa presence in northeastern Kansas, although prior to A.D. 1800, was not strongly felt until about this time, which likely discouraged Pawnee visits to this area around this time. It is possible the lack of Sioux quartzite at the Hill site is a response to pressures from the Kansa.

As mentioned earlier, quartzites are primarily used in the manufacture of large discoidal "chopper-scraper" hide processors, or what Wedel (1936:76) and Strong (1935:60). This is because of the knappability of coarse-grained quartzites; they split between grains rather than conchoidally. These large hide processors were not included in the chipped stone analysis for reasons that were outlined in earlier. However, byproducts of these tools (flakes detached through thermal alteration, reworking of tool edges, or use) were often indistinguishable from chipped stone manufacture in the 14RP1 collection. The lack of quartzite flakes from the Hill site supports the suggestion that primarily finished tools were collected. Also, the hide processors from the Hill site that are in the collections curated at the Nebraska State Historical Society were manufactured on a light green coarse sand conglomerate typical of the Ogallala formation and distinct from the primary quartzites utilized at 14RP1.

The second major difference between 25WT1 and 14RP1 is the presence of gunflints of different European manufacture (Table 9). Gunflints first appear in France around 1675 (Hamilton 1982:190). These were the wedge-shaped spall style, which was the prevailing style of gunflint from 1700 until about 1750 (Blaine and Harris, 1967:83; Blaine 1992; Hamilton

Table 9: Comparison of Gunflints from 14RP1 and 25WT1.

25WT1 Gunflints Total: 17			**14RP1 Gunflints Total: 39**		
European Made		**Native Made**	**European Made**		**Native Made**
Blade n=8	**Spall n=0**	**n=9**	**Blade n= 9**	**Spall n=1**	**n=31**
Brandon n=8		Alibates n=4	French n=5	French n=1	Alibates n=7
		Pennsylvanian n=1	Unidentified (French) n=4		Boone/Reed Springs n=1
		Smoky Hill jasper n=3			Fossil Wood n=1
		White River Group n=1			Permian n=7
					Smoky Hill Jasper n=7
					*Unidentified n=6

1982:190; White 1976:72). By 1720, the Pawnee had obtained guns from the French in exchange for furs (Hyslop 2006:2-13). By 1775, the spall technique of gunflint manufacture had been

supplanted by the blade technique in France (Hamilton 1982:190). This technique was not introduced to the English until sometime around 1780 to 1800 (White 1976:78). Therefore, British blade gunflints did not appear in North America until about 1800 or later (Mann 1999:417; Kent 1983).

To reiterate this point, Witthoft (in Hamilton 1982) has demonstrated that during the French and Indian War (Seven Year's War) from 1754 to 1763, none of the European manufactured gunflints found in American were of the British blade variety (Hamilton 1982:190). Instead, all the flints were French, with about an equal percentage of spall style and the conventional blade style (Hamilton 1982:190). During the American Revolution of 1775 to 1783, approximately five percent of the European manufactured gunflints found in America are the British blade style (Hamilton 1982:190). This indicates that even the British at this time were using primarily French gunflints. This period is also considered the high point of French

Figure 23: On Left: French Blade and Spall Gunflints from 14RP1. (Top Row: Heavily utilized blade gunflints of the classic "blonde" French flint. Bottom Row: Heavily utilized blade gunflint, blade gunflint with relatively little use, and spall gunflint with no use). On Right: British Blade Gunflints from 25WT1. (All show signs of little to no use).

manufacture and export of gunflints, with around 30-40 million produced annually (Emy and de Tinguy 1964:60; White 1976:29). During the War of 1812, from 1812 to 1815, approximately fifty percent of European manufactured gunflints found in America are of the British blade variety (Hamilton 1982:190). This marked increase in British blade gunflints in America during this time corresponds to the Napoleonic Wars of 1803-1815 when there was a ban on French exports (White 1976:29).

All 14RP1 gunflints of European manufacture appear to be French in origin (Figure 23). Five of these are of the blade style, and only one gunflint from 14RP1 is of the French spall style. Hamilton (1982:196) notes that the proposed occupational dates for 14RP1 are a little late for French spall style gunflints. However, Smith (1982:154) suggests that a few gunflints of this style would likely be produced as a byproduct of blade production. He also noted that French gun spalls are almost always produced out of gray varieties of French flint and not out of the classic blond French flints commonly associated with the blade technique (Smith 1982:154). The single spall gunflint from 14RP1 is of the gray variety (Figure 22). Smith notes that two French gun spalls are in the collections from 14RP1 (Smith 1982:154). However, only one was present in the assemblage at the time of this analysis.

At 25WT1, all gunflints of European manufacture are of British origin and likely from Brandon, England (Figure 22). Six of this style are present in the collection analyzed for this study. Hamilton (1960:79; 1982:195) mentions a single French spall style of gray flint from the Hill site, as well as three English blade style flints. However, the French spall flint was missing from the collection analyzed for this report. It is possible this flint was not related to the Pawnee occupation at the Hill site, and Hamilton's later report (1982) does not mention a site association for this artifact, simply stating it was found in Webster County. He also omits it from his

synopsis of gunflints from the Hill site curated at the Nebraska State Historical Society (Hamilton 1960:75; 1982:192).

Hamilton (1982:192) suggests that the English blade gunflint became the predominant form on the upper Missouri where trade flourished from 1810 to 1870 (Hamilton 1982:192). Prior to this time, gunflints of French manufacture predominated. The presence of British blade gunflints at 25WT1 and the apparent lack of French flints suggest that the Hill site, although potentially contemporaneous with the later years of occupation at 14RP1, was primarily occupied at a later time than 14RP1. Site 14RP1 was likely abandoned prior to the time of British blade gunflint predominance in the area, and was possibly already abandoned or in its final years of occupation before the British blade gunflint even entered the area around 1800.

The Stabaco site (25HW16), a Skiri village occupied ca. 1740-1750, has both French and English gunflints. Two British blade gunflints were found on the surface of the site (Watson 1995:174). These are believed to be intrusive and a result of hunting at the site at least fifty years, and perhaps even eighty years after the time of the Pawnee occupation (Watson 1995:174-175). Both blade (n=4) and spall (n=1) style French flints were recovered from the site (Watson 1995:197). In addition, eighteen native-made gunflints were recovered, including five made of Smoky Hill jasper, six manufactured out of Permian, three resembling White River Group silicates, and four unidentified (Watson 1995:197). Native-made gunflint materials from 25WT1 and 14RP1 are similar to those found at the Stabaco site. Important to note is that one of the unidentified specimens from 25WT1 is described as a "red-purple" material, and may be Alibates (Watson 1995:177).

Similar to 14RP1, native-made Alibates gunflints are also present at 25WT1. Alibates has been demonstrated to be more durable than both French and English flints, with an average

gunflint use-life of around one hundred shots per flint compared to only thirty to forty for French and English materials (Phillips 2002). The presence of Alibates at 14RP1 and 25WT1 may represent interactions with the Wichita or other groups to the south and southwest of the Kitkahahki homeland. However, Alibates gunflints are not documented in reports of Wichita sites, as highlighted below. Another potential source for Alibates gunflints is the Western Comanche who greatly influenced trade networks on the Southern Plains (Hamalainen 1998:485).

At Lasley Vore (34TU65), occupied from at least 1719 to 1750 (if Lasley Vore was the village LaHarpe visited in 1719), French blade gunflints are present, but there is no mention of Alibates native-made gunflints (Odell 2002:233). There is mention of native-made gunflints of Reed Springs chert similar to one from 14RP1 (Odell 2002:233). The Gilbert site (41RA13), occupied in the late 1700's has both French blade and spall style gunflints, but no mention of native-made Alibates gunflints (Blaine and Harris 1967:81-84). There are, however, native-made gunflints manufactured out of Permian chert from the Gilbert site similar to those from 14RP1 (Blaine and Harris 1967:81-84).

Sudbury (1976) recorded a series of fifty-eight native-made gunflints from the Deer Creek site (34KA3), dated 1725 to 1750 (Sudbury 1976:36; Hawley 2004:22). Of these, twenty were produced of Florence A chert (Hawley 2004:22). The remaining gunflints (n=38) are described as coming from "fourteen different types of non-local but probably regional chert types" (Hawley 2004:22). Alibates is not directly mentioned. Five gunflints of native manufacture were reported from initial excavations at the Bryson-Paddock site (34KA5), dated from 1720 to 1760 (Hartley 1975:54; Hawley 2004:22). Of these, two were made of Florence A chert, and one of Alibates (Hartley 1975:54; Hawley 2004:22). Nine additional native-made

gunflints were found at Bryson-Paddock during subsequent excavations (Hawley 2004:22; Hartley and Miller 1977:121). Two of these were produced of Florence A chert, while the remaining seven were made of non-local cherts (Hawley 2004:22). The Bryson-Paddock site is the only site included here where Alibates is directly mentioned in the literature as a lithic source for gunflint manufacture. Blaine (1967) reported five French spall flints and three French blade flints from the Longest site (23JF1), dated 1750 to 1800 (Blaine 1967:177-179). He also reported nine native-made gunflints from the site, but did not provide descriptions of material types (Blaine 1967:178).

Hartley and Miller (1977) observed a pattern of native-made gunflint manufacture at Bryson-Paddock similar to that of 14RP1 and 25WT1. They observed that "the inhabitants of the Bryson-Paddock site were not themselves making most of their gunflints. Whether the flints were supplied by the French from other Indian groups or obtained through preexisting aboriginal trade networks" remains unclear (Hartley and Miller 1977:121). They reject the hypothesis that "the flints were locally made of non-local materials" because of the lack of associated debitage and other tools manufactured from these materials (Hawley 2004:22). A similar pattern has been observed at 14RP1 and 25WT1; Alibates occurs primarily as gunflints and strike-a-light flints while associated debitage and other tool forms of this material type are sparse. Sudbury (1976) also commented on the relatively high frequency of non-local cherts used to manufacture the gunflints at the Deer Creek site (Hawley 2004:22; Sudbury 1976:36). He suggests that the inhabitants of the Deer Creek site preferred gunflints manufactured of non-local cherts when French flints were unavailable, and only when gunflints were in limited supply would they be produced out of local materials (Hawley 2004:22; Sudbury 1976:36). Sudbury also mentions

that status may have played an important role in the acquisition of gunflints of non-local materials (Hawley 2004:22; Sudbury 1976:36).

Both the Wichita and the Pawnee appear to have preferred gunflints manufactured of non-local materials. How they obtained these materials is an intriguing question eluding answer at this juncture. It is likely that while major trade expeditions may not have visited these sites directly, trade at the individual level was certainly common. Individual French traders most definitely visited these sites frequently, and Pawnee and Wichita members likely traveled to visit the French as well. At the same time, interaction was taking place from all directions amongst the three, with each group at different times likely serving in the role of originator, recipient, and middleman. Other groups, including Europeans, Americans, and other Native groups also contributed to trade interactions at these sites to various degrees. Hamilton (1982) mentions a similar phenomenon with French gunflints: "the mere presence of French gunflints on a site does not mean that the gun in which they were used was also of French manufacture, nor that the trade itself was basically French" (Hamilton 1982:191).

Figure 24: Possible Chipped Stone Gaming Pieces from 25WT1.

A final unique chipped stone tool form was noted from the Hill site. These appear to be either pipe drills or triangular unnotched arrow points that have been heavily utilized and are at the end of their use life (Figure 24). Two of these were recorded in the Hill site collection, one manufactured of Permian chert, the other produced out of Smoky Hill jasper. The possibility that these were once drills is intriguing since no chipped stone drills or awls have been recorded in both collections. The lack of chipped stone drills suggests that they have been almost

completely phased-out by European metal awls and punches. These two items are relatively thick and likely were not arrow points. The high polish and dulled edges suggests that these items were carried around and subject to abrasive activity. A final suggestion is that these two artifacts may have served a non-utilitarian role, such as gaming pieces. Use-wear analysis could shed light on the interpretation of these pieces.

CHAPTER 6
Conclusions and Future Research

This thesis is a comparative inductive pattern study aimed at addressing the similarities and differences in chipped stone artifacts found within two Kitkahahki sites, while at the same time aiding in site interpretations and chronological assessments between the two. It will ultimately help to characterize the Pawnee, specifically the Kitkahahki band transition away from chipped stone technologies in the decades around A. D. 1800. It provides a foundation for future research and comparisons with other protohistoric and historic sites on the Plains outside of the Kitkahahki core group.

The majority of the thesis focuses on material type distributions from the Hill site and 14RP1. Throughout, it was demonstrated that four primary material types are found at both sites: Smoky Hill jasper, Florence, Quartzite, and Alibates. However, slightly different representations of these materials are found at each site. Intra-site comparisons can be made only for 14RP1 because of the limited sample and exceedingly limited associated provenience documentation from the Hill site. It was established that three houses at 14RP1 (Houses 3, 5, and 6) have perhaps the richest distribution of chipped stone and metal artifacts overall, likely influenced by several factors including the nature of lodge abandonment, recovery biases, and history of occupation. It was argued that different chipped stone material type distributions found within these houses may be attributed to changing territoriality, closely linked with bison hunting, through time.

A review of patterned tools vs. debitage from the two sites confirmed the suspicion that the Hill site assemblage represents a highly selective collection. It was noted that at 14RP1, quartzite was not targeted as a primary chipped stone material; rather it was incorporated into the

site through ground stone tools. It has been documented at other contemporaneous sites that "rough stone such as quartzite and sandstone were used primarily for grinding" (Odell, ed. 2002:84).

At both sites, Alibates appears to have been selectively utilized as strike-a-light flints and gunflints, perhaps due to functional properties. How Alibates is introduced to the sites is a question whose answer remains elusive at this juncture, but may reflect interactions with groups to the south or southwest of the Kitkahahki homeland. The Wichita connection for these materials seems unlikely due to the rarity of Alibates recovered from excavated Wichita sites. Explorations of archaeological materials from Western Comanche sites and other groups on the Southern Plains may shed light on this problem.

The presence of White River Group Silicates at the Hill site, with sources to the west and northwest, may indicate an interaction with the Arikara through the Skiri Band, as Holen has suggested (1995:130). The lack of Sioux quartzite may indicate that the Kansa presence was strongly felt in northeastern Kansas, a source area for Sioux quartzite, at the time of the Hill site occupation. The presence of British blade gunflints produced out of Brandon chert from the Cliffs of Dover region in England indicates that the site was occupied post-1800. This is also suggested by Zebulon Pike's visit to the site in 1806. The apparent lack of British produced gunflints at 14RP1 suggests that the site was abandoned around 1800 and likely not reoccupied.

The introduction and incorporation of European metal items into traditional tool kits had a pervasive effect on chipped stone technologies. Through comparisons with the Stabaco site, it was demonstrated that availability and access to metal almost certainly played a greater role in determining tool functionality than lithic material quality. It appears that scrapers are more likely to be produced out of Smoky Hill jasper than Permian cherts at both the Hill site and

14RP1, indicating that Permian cherts were not selectively targeted for specialized use as scrapers. Tools used to perform daily domestic chores with a ready-made European imitation, such as knives, were the first to be replaced by metal trade items. Highly patterned artifacts without a ready European imitation, such as plano-convex endscrapers, were replaced next. As metal became more readily available, less effort in procurement of lithic materials took place, resulting in "less well made tools from lower quality stone" (Hudson 1993:275). The ratios of chipped stone to metal artifacts from 14RP1 supports the notion that items with a simplistic function, namely cutting and piercing, were replaced first (arrow points and knives), followed by scrapers. Awls were minimally discussed because no chipped stone equivalents of these tools were recorded. However, the presence of metal awls at 14RP1 (n=8) suggests that these tools may have been almost entirely phased out by European introduced metal counterparts by this time.

In the future, it is imperative to expand this research to include other protohistoric and early historic sites on the Plains outside of the Kitkahahki core group. The introduction and impact of European trade items likely did not have the same consequences for all native groups. Other groups may have responded differently and at different rates than the Kitkahahki to the incorporation of these items into their traditional tool kits. Comparisons to other sites will help provide an understanding of what artifacts are being replaced first, and why, as well as the factors influencing those changes. We might expect some time transgressive variations in the availability and adoption of European items across the region.

Better understandings of the nature of lodge abandonment can potentially help to explain the noticeable differences in artifact distributions amongst lodges. Planned vs. quick or sudden unplanned abandonment should display different representations of materials found within

lodges (e.g. Nelson and Schachner 2002). Comparisons to other assemblages, including bone tools, ceramics, metal items, ground stone tools, etc. will help to compensate for the limited quantities of chipped stone found within lodges. Ultimately, these comparisons will provide a better understanding of the processes influencing the collections, and the site in general. Coupled with information obtained through archaeomagnetic dating and dendrochronology, the artifact assemblages will help to refine our knowledge of the history of occupation at 14RP1. This information will ultimately aid in interpretations of the number of occupations or building episodes through time, abandonment and the factors contributing to abandonment, and site layout and organization at 14RP1.

Perhaps the most important goal is the completion of the excavation of House 13 at 14RP1. This will make possible a scale of chipped stone analysis from a single Pawnee lodge that has never been attempted. The potential for identifying individual activity areas and discard patterns on the floor of the lodge, as well as discerning the similarities and differences of activities that took place on the roof of the lodge as opposed to inside will provide a powerful comparative reference tool for investigating activity variation associated with Pawnee lodges.

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APPENDIX

Chipped Stone Databases

Table 1: 14RP1 Chipped Stone Materials Collected by Carlyle Smith in 1949.

Material	Spec. #	Field #	Fea.	House	Sub-Unit	Elev	Artifact Type	Length	Width	Thick	Wgt.	Comments
Alibates	14202-01	261	3	1	Dirt Pile, House 1	NA	Gun Flint	29.2	26.7	8.3	8	Alibates gun flint
Alibates	14119-01	140	6	2	South Side of House 2	NA	Gun Flint	25	22.7	8.3	5.2	Alibates gun flint
Alibates	14215-17	279	NA	NA	Surface Collection South Field	NA	Tabular fragment, biface/tool edge	37.9	27.8	23	11.6	Alibates fragment, possible edge of biface
Alibates	14215-29	279	NA	NA	Surface Collection South Field	NA	Utilized Flake, Strike-a-light? Scraper?	63.8	58.6	19.6	84	Large Alibates flake, possibly a gun flint or scraper
Alibates	14215-35	279	NA	NA	Surface Collection South Field	NA	Blocky Debris	22.4	19.1	14.1	7.2	Alibates blocky fragment
Alibates	14215-37	279	NA	NA	Surface Collection South Field	NA	Gun Flint	23.6	17.2	5.6	2.7	Alibates Gun Flint
Alibates	14523-01	NA	12	NA	Fireplace test trench	13"	Gun Flint	23.3	22.7	5.1	4.7	Alibates gun flint
Basalt	14215-38	279	NA	NA	Surface Collection South Field	NA	Secondary Flake	49.3	40.3	17.9	34.2	Secondary Flake from ground stone tool
Euro. Unid.	14045-01	47	3	1	Northwest Side of House 1	NA	Gun Flint	26	15.8	7.6	3.7	Complete Gun flint (European?)
Euro. Unid.	14045-03	47	3	1	Northwest Side of House 1	NA	Gun Flint	24.4	24	6.3	4.7	Complete Gun flint (European?)
Florence B	14055-01	58	3	1	North Side of House 1	NA	Gun Flint	45.7	32.1	11.7	14.5	Permian chert gun flint
Florence B	14080-01	92	3	1	House 1 General	NA	Biface Fragment	74.3	62.8	13.9	63.2	Permian chert biface fragment
Florence B	14133-01	162	6	2	Northeast Side of House 2	11"	End Scraper	90.1	58.7	24.1	126.2	Permian chert unifacial end/side scraper
Florence B	14156-02	197	6	2	North Side of House 2	NA	Gun Flint	54.7	37.8	10	25.3	Large Permian Chert gun flint
Florence B	14211-01	272	NA	NA	Surface Collection South Field	NA	Preform	35.4	34.6	7.1	11.6	Permian Chert projectile point preform fragment
Florence B	14215-10	279	NA	NA	Surface Collection South Field	NA	Secondary Flake	21.5	13.6	8.1	1.4	Permian chert fragment
Florence B	14215-28	279	NA	NA	Surface Collection South Field	NA	Gun Flint	25.8	19.7	6.7	4.1	Gun flint
Florence B	14215-33	279	NA	NA	Surface Collection South Field	NA	Gun flint	25.6	21.2	6.2	4.4	Permian Chert gunflint Fragment

Material	Spec. #	Field #	Fea.	House	Sub-Unit	Elev	Artifact Type	Length	Width	Thick	Wgt.	Comments
Florence B	14215-40	279	NA	NA	Surface Collection South Field	NA	Secondary Flake	21.3	17.4	6.7	2.3	Permian chert flake
Florence B	14215-44	279	NA	NA	Surface Collection South Field	NA	Possible scraper or strike-a-light	41.9	23.5	7.9	6	Possible scraper/strike-a-light
French Flint	14215-32	279	NA	NA	Surface Collection South Field	NA	Gun flint fragment	24.8	19.1	7.2	3.7	SHJ flake fragment
Penn.	14215-30	279	NA	NA	Surface Collection South Field	NA	Secondary Flake	28	16.4	8.8	3.2	Permian chert flake
Permian	14099-01	118	6	2	Southwest Side of House 2	NA	Secondary Flake	35.6	21.7	10.1	4.5	Permian chert flake
Permian	14215-39	279	NA	NA	Surface Collection South Field	NA	Secondary Flake	19.4	18	3.9	1.1	Permian chert flake
Quartzite	14055-02	58	3	1	North Side of House 1	NA	Quartzite Spall	38	29.3	8.7	10.4	Spall of Quartzite from a ground stone tool
Sioux Quartzite	14081-01	93	3	1	House 1 General	NA	Digger/Hoe-like	159.2	84.9	24.6	288.4	Sioux quartzite hoe/digger
Smoky Hill J.	14021-01	20	NA	1	South Side of House 1	NA	One flake removed/ polished	48.7	37	10.8	14.8	Weathered spall of SHJ with one flake removed, slight nibbling
Smoky Hill J.	14061-01	64	3	1	North Side of House 1	NA	Radial flake, from scraper?	19.1	16.5	3	1.1	SHJ radial flake fragment. One edge unifacially retouched
Smoky Hill J.	14061-02	64	3	1	North Side of House 1	NA	Blocky debris	15.3	10.9	8.2	1	SHJ flake (blocky debris)
Smoky Hill J.	14077-01	89	3	1	House 1 General	NA	Secondary Flake	28.8	17	6.5	2.5	secondary flake, slight nibbling on one dorsal edge
Smoky Hill J.	14077-02	89	3	1	House 1 General	NA	primary flake	22.1	15	5.4	1.3	SHJ Flake
Smoky Hill J.	14135-01	164	6	2	Northeast Side of House 2	11"	Gun Flint	25.9	23.4	7.7	6.8	SHJ Gun Flint
Smoky Hill J.	14175-01	220	6	2	West Side of House 2	NA	Tertiary flake	17.7	17.2	3.8	1.3	SHJ Flake, burned
Smoky Hill J.	14178-01	225	6	2	Doorway of House 2	NA	Tertiary, Biface Thinning flake	25.9	17.2	5	2.4	SHJ flake fragment
Smoky Hill J.	14178-02	225	6	2	Doorway of House 2	NA	Secondary Flake	25.4	14.9	5.9	1.7	SHJ flake fragment

Material	Spec. #	Field #	Fea.	House	Sub-Unit	Elev	Artifact Type	Length	Width	Thick	Wgt.	Comments
Smoky Hill J.	14091-01	106	NA	NA	Burial 1. Disturbed Grave	NA	Tertiary flake	17	10.8	4.6	0.9	SHJ Flake Fragment
Smoky Hill J.	14091-02	106	NA	NA	Burial 1. Disturbed Grave	NA	Secondary biface thinning flake	21.5	16.8	5.1	1.3	SHJ secondary Flake, biface thinning
Smoky Hill J.	14091-03	106	NA	NA	Burial 1. Disturbed Grave	NA	primary flake	20.4	15	3.3	0.8	Primary flake
Smoky Hill J.	14091-04	106	NA	NA	Burial 1. Disturbed Grave	NA	Blocky debris/shatter	10.4	8.2	4.5	0.2	SHJ flake (shatter)
Smoky Hill J.	14211-02	272	NA	NA	Surface Collection South Field	NA	Gun Flint	22.3	16.2	8.2	2.5	SHJ gun flint fragment
Smoky Hill J.	14211-06	272	NA	NA	Surface Collection South Field	NA	Tertiary flake, utilized	22.6	18.3	6	2.1	Utilized tertiary flake
Smoky Hill J.	14215-01	279	NA	NA	Surface Collection South Field	NA	Tertiary biface thinning flake	16	13.6	3.3	0.6	SHJ biface thinning flake fragment
Smoky Hill J.	14215-02	279	NA	NA	Surface Collection South Field	NA	Secondary Flake	24.1	18.1	4.2	1.9	SHJ flake fragment
Smoky Hill J.	14215-03	279	NA	NA	Surface Collection South Field	NA	Tertiary, Biface Thinning flake	14.5	13.8	2.5	0.6	SHJ flake fragment
Smoky Hill J.	14215-05	279	NA	NA	Surface Collection South Field	NA	secondary flake	16.7	13.3	3.8	0.6	SHJ flake
Smoky Hill J.	14215-06	279	NA	NA	Surface Collection South Field	NA	Primary Flake	21.2	12.5	4.1	0.8	SHJ flake fragment
Smoky Hill J.	14215-07	279	NA	NA	Surface Collection South Field	NA	Utilized secondary flake	18.5	15.3	4.4	1.1	Utilized secondary flake
Smoky Hill J.	14215-08	279	NA	NA	Surface Collection South Field	NA	Tertiary, no platform	17.3	13.3	2.8	0.8	SHJ flake fragment
Smoky Hill J.	14215-09	279	NA	NA	Surface Collection South Field	NA	Primary flake, modified	19.2	19	8.4	2.6	Primary flake, modified
Smoky Hill J.	14215-11	279	NA	NA	Surface Collection South Field	NA	secondary flake, no platform	16.8	13.9	2.9	0.6	SHJ flake fragment
Smoky Hill J.	14215-12	279	NA	NA	Surface Collection South Field	NA	Blocky Debris	35.4	16	9.4	6.3	SHJ blocky fragment
Smoky Hill J.	14215-13	279	NA	NA	Surface Collection South Field	NA	blocky debris	32.9	17.3	10.6	4.3	SHJ blocky fragment

Material	Spec. #	Field #	Fea.	House	Sub-Unit	Elev	Artifact Type	Length	Width	Thick	Wgt.	Comments
Smoky Hill J.	14215-14	279	NA	NA	Surface Collection South Field	NA	Tertiary Flake	17.9	13.3	4	1	SHJ flake fragment
Smoky Hill J.	14215-16	279	NA	NA	Surface Collection South Field	NA	Strike-a-light	52.5	27.5	12.2	17.9	SHJ strike-a-light
Smoky Hill J.	14215-18	279	NA	NA	Surface Collection South Field	NA	Radial flake	36.3	19.6	5.8	4.2	Radial flake fragment
Smoky Hill J.	14215-19	279	NA	NA	Surface Collection South Field	NA	Triangular radial fragment	15.3	9	1.8	0.2	SHJ flake fragment
Smoky Hill J.	14215-20	279	NA	NA	Surface Collection South Field	NA	Secondary Flake	24.9	16.2	4.2	1.6	SHJ flake fragment
Smoky Hill J.	14215-21	279	NA	NA	Surface Collection South Field	NA	Tabular, radial (?) fragment	30.9	18.8	6.1	4.5	SHJ Flake Fragment (possible radial break)
Smoky Hill J.	14215-22	279	NA	NA	Surface Collection South Field	NA	Secondary flake	18.4	11.4	4.6	0.5	SHJ flake fragment, near cortex
Smoky Hill J.	14215-23	279	NA	NA	Surface Collection South Field	NA	Secondary Flake	27.7	19.8	6.4	3.8	SHJ flake fragment
Smoky Hill J.	14215-24	279	NA	NA	Surface Collection South Field	NA	Tabular fragment, flakes removed	32.3	24.1	6.5	6.8	SHJ fragment with unifacial removals on one edge
Smoky Hill J.	14215-25	279	NA	NA	Surface Collection South Field	NA	Retouch tertiary flake, possibly biface tool edge	18.5	13.5	3.9	1.1	SHJ flake (possibly from bifacial tool edge)
Smoky Hill J.	14215-26	279	NA	NA	Surface Collection South Field	NA	Blocky Debris, thermal spall?	31.5	14.4	6.8	3.7	Blocky debris, thermal spall?
Smoky Hill J.	14215-27	279	NA	NA	Surface Collection South Field	NA	Blocky Debris	25	10	7.3	1.5	SHJ blocky fragment
Smoky Hill J.	14215-31	279	NA	NA	Surface Collection South Field	NA	Blocky Fragment	27.2	17.4	13.8	8.2	SHJ blocky fragment
Smoky Hill J.	14215-34	279	NA	NA	Surface Collection South Field	NA	Split river cobble	41.9	39	15.5	15.3	Natural SHJ fragment (split river cobble)
Smoky Hill J.	14215-36	279	NA	NA	Surface Collection South Field	NA	Probable gun flint	30.2	28.5	11.7	11.3	SHJ blocky fragment
Smoky Hill J.	14215-41	279	NA	NA	Surface Collection South Field	NA	side and end scraper	67.4	39	11.5	29.9	SHJ end/side scraper

Material	*Spec. #*	*Field #*	*Fea.*	*House*	*Sub-Unit*	*Elev*	*Artifact Type*	*Length*	*Width*	*Thick*	*Wgt.*	*Comments*
Smoky Hill J.	14215-43	279	NA	NA	Surface Collection South Field	NA	End/side Scraper	80.8	35.6	11.7	39.2	SHJ end/side scraper on secondary flake
Smoky Hill J.	14210-01	271	NA	NA	Surface Collection South Field	NA	Gun Flint	30	27	7.7	7.3	Gun flint, possibly SHJ. Residue on one surface
Unident. Chert	14045-02	47	3	1	Northwest Side of House 1	NA	Gun Flint	22.2	17	6	2.8	Complete Gun Flint (European?)
Unident. Chert	14099-02	118	6	2	Southwest Side of House 2	NA	Bipolar split pebble	33.9	28.7	11.3	9.8	Bipolar split pebble, river gravel
Unident. Chert	14156-01	197	6	2	North Side of House 2	NA	Gun Flint	30.7	26	10.4	7.8	Heavily battered gun flint possibly reworked from base of point
Unident. Chert	14215-04	279	NA	NA	Surface Collection South Field	NA	Gun Flint	17.7	16.7	7.2	3.4	Gun flint of Unidentified Chert material
Unident. Chert	14215-42	279	NA	NA	Surface Collection South Field	NA	Bipolar river pebble	31.8	14.4	12.7	3.8	Unidentified Bipolar fragment, Burlington?

APPENDIX

Chipped Stone Databases

Table 2: 14RP1 Chipped Stone Materials Collected by Thomas Witty, Jr. from 1965 to 1968.

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Alibates	87	598		133	3			Blocky Debris	44.3	28.8	13.8	24.6	From Larger flake, burned
Alibates	87	599		133	3			Blocky Debris	40.3	35	15.2	23.5	Burned blocky debris
Alibates	113	2367			3	Fill		biface frag. possible beveled knife mid-section	35.7	19	12.8	6.4	Fire Cracked beveled knife edge fragment
Alibates	108	720			3	Bench top fill		retouch flake, graver?	18.9	18.5	3.5	1.1	retouch flake, possible graver
Alibates	113	444			3	Fill		Tertiary flake, flake tool	34.4	27.3	11.4	7.3	Flake tool fragment, No cortex, potlids
Alibates	108	719			3	Bench top fill		Tertiary Modified flake, large spall	57	22.6	15.6	19	Spall, tertiary flake
Alibates	185	1088		249	4			Scraper, unifacial side scraper	63.3	36.3	14.8	32.9	Uniface side scraper
Alibates	5	2650			4		0-0.5'	Tertiary flake, flat/crushed platform	18.5	18	3.7	1.4	Tertiary flake with crushed/flat platform and feather/normal termination
Alibates	421	4894		SW Borrow Pit	5			Gunflint	20.7	17.1	6.4	2.8	Gunflint
Alibates	265	3613		425	6			strike-a-light, biface	62.5	37.4	11.9	32	biface strike-a-light
Alibates	229	2912			6	NE ¼	0-0.5'	Tertiary flake	19.6	14.2	4.5	1.4	Alibates tertiary flake
Alibates	383	3482			7	Post Hole		Gunflint	39.2	34.7	9.3	15.7	Gunflint, refit
Alibates	672	5465	31	East Side of fenced area (parking lot)			0-0.5'	Gunflint	23.6	20.5	6.2	5.2	Alibates gunflint
Alibates	156	10	9	NW of H 2. borrow or midden area		Surf.	0-0.5'	Arrow point	27.9	16.1	4.6	1.4	Scallorn pt, Alibates, stem width 6.5
Alibates	156	18	9	NW of H 2. borrow or midden area		Surf.	0-0.5'	Tertiary flake, from scraper/knife	20.4	20.3	4.1	1.3	Tertiary flake, from scraper/knife
Alibates	376	3417	555	NW of H 2. borrow or midden area			0-.5'	Radial, Flake splintered, no platform, no cortex, radial break	40.5	14.2	6.4	3.7	Flake Fragment, shatter, radial
Alibates	372	3696	564	NW of H 2. borrow or midden area			0-1.0'	strike-a-light	47	22.4	9	8.8	biface strike-a-light on projectile point?

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Alibates	419	4615		Surface		Surf.	Surf.	Tertiary flake	30.7	26	4.3	2.1	Tertiary flake with slight serration, nibbling on edges, from use?
Basalt	174	1054		224	3			Scraper on large decortication flake	106.5	65.3	16.9	144.4	Scraper, hide grainer, polish
Basalt	15	2589			4		0.5-1'	Biface, small, on secondary flake	52.3	33.9	12.4	19.8	Sm biface on secondary flake, cobble cortex
Basalt	363	3561			7		0-1.0'	Secondary flake	91.4	47.1	18	68.3	Basalt secondary flake
Basalt	478	5952		2067	22			Secondary Flake	22.2	16.3	6.5	1.6	Basalt secondary flake, No Prov. Code
Basalt	460	5488			22	south side	0.5-1'	Secondary flake	23.9	15.6	7.3	3.2	Secondary flake
Boone?	421	4981		SW Borrow Pit	5			Gunflint	27.3	24.4	8.5	6.1	Gunflint
Burlington Crescent	609	5990			5	north west sector	0.0-1.0'	spall, potlid	33.1	23.8	3.9	3.5	Potlid spall
Burlington Crescent	156	11	9	NW of H 2. borrow or midden area		Surf.	0-0.5'	Scraper on secondary flake	41.7	20.5	7	5.6	Scraper on secondary flake
Burlington Crescent	156	19	9	NW of H 2. borrow or midden area		Surf.	0-0.5'	Tertiary flake	20.9	12.8	2.6	0.5	tertiary flake
Chalcedony	244	3662		418	6	Bell-shaped cache pit near entry		bifacially flaked edge	25	24.2	7.7	4.9	Bifacially flaked chalcedony with polish, residual cortex
Chalcedony	432	5368	4	W side of casement road, northeast of A671			0-0.3'	Uniface flake tool	47.3	32.3	9.9	13.7	Uniface flake tool
Chalcedony unidentified	244	3647		418	6	Bell-shaped cache pit near entry	0-1.0'	Blocky Debris	25.1	22.1	8.3	3.6	Unidentified chalcedony, river gravel cortex
Dakota Quartzite	626	6532		2197 (between H3 & H12)		Trash-filled pit	0-0.5'	Biface Fragment	63.7	48.2	15.3	57.1	Biface fragment, lots of wear
Dakota Quartzite	402	4217	546	NW of H 2. borrow			.5-1.0'	Spall, Hammer	48.5	35.7	8.5	16.4	Spall from hammer

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
				or midden area				stone					
Europ. Unid.	421	5050			5	SW borrow pit		Gunflint	27.4	30.9	6	5.5	Gunflint, European?
Florence	113	445			3	Fill		Radial, retouched	40.2	10.8	5.9	2.1	Residual cortex
Florence	113	881			3	Fill		Secondary flake	28.6	24.9	5.8	2.6	Limestone, probably cortex from Florence, Pennsylvanian
Florence	382	4076		644	6			Biface Preform, Ovate	80.2	54.5	11.9	57.3	Biface Preform, Ovate
Florence	239	2793			6	SE 1/4	0-.5'	Endscraper	31.2	27	13.4	10.6	Chalky cortex, frost fracture, Distal endscraper, broken, reworked
Florence	238	2750			6		0-.5'	Tertiary flake	17.4	14.3	4.5	1	tertiary flake
Florence	1	7		Surface			Surf.	Projectile Point base, Mckean, battered blade	35.6	19.4	8.2	5.7	Projectile Point base, Mckean, basal width: 17.8 m. Possible strike-a-light
Florence	335	3424	110	Small mound 45' east of site, old golf green			0.5-1'	Tertiary Flake	22.4	15.8	5.4	2.6	Tertiary flake
Florence	?	8		Surface		Surf.	Surf.	Drill tip/point tip? Ear from Allen Point?	19.5	13.6	5.4	1	Possible Drill tip/arrow tip
Florence A	131	745		330	3			End scraper on SD flake	33.6	22.9	9.6	8.1	End Scraper
Florence A	244	2917-1		418	6	Bell-shaped cache pit near entry		Tertiary flake	13.2	12.8	2	0.3	Tertiary flake fragment
Florence A	201	3073-2			6	Along N-S mid-line	0-.5'	Tertiary Flake, Retouch	12.1	7.5	2.4	0.2	Tertiary Flake
Florence A	156	9	9	NW of H 2. borrow or midden area		Surf.	0-0.5'	Arrow point, triangular	15.1	13.5	4.8	1	Triangular pt, (Wichita)
Florence A	379	3862	584	NW of H 2. borrow or midden area			.5-1.0'	Gunflint	26.2	15.6	6	3.3	Gunflint
Florence A	335	3422	110	Small mound 45'			.5-1.0'	Bipolar piece	45.6	13.1	14.6	12.5	Bipolar Piece, bifacial

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
				east of site, old golf green									
Florence B	655	2561			3		Sod-.35'bs	Biface edge frag.	31.7	16	9.4	3.5	Biface edge fragment
Florence B	31	2146			3		.25-.5'	Biface edge fragment	31.4	18.1	11.2	4.7	Biface edge fragment
Florence B	652	2404			4	Fill		gunflint?, flake tool	26.8	19.1	4.3	2.4	Prob. Gunflint, thin
Florence B	663	3228		423	6	edge of floor north of altar		Flaked cobble	79.9	67.2	19.5	118.8	Flaked cobble, strike-a-light?
Florence B	238	2721			6		0-.5'	Core (battered blocky debris?)	47.1	38.7	15.8	31.5	Matrix cortex
Florence B	263	2894			6	sw 1/4 fill	0-.5'	Secondary flake	28.7	20.3	7.2	2.7	Secondary flake
Florence B	194	3058-2			6		0-.5'	Tertiary fragment	10.4	8.8	3.1	0.3	Tertiary flake fragment, potlids
Florence B	356	3462		619	7			Scraper, side unifacial	88.6	58.3	16.4	94.9	Spall, large scraper-side, burned
Florence B	483	5920		2022		Borrow Pit for H23, South of south fence line		Secondary Flake, Crushed Distal dorsal	43	40	12.5	17.5	SD Flake with crushed distal end
Florence B	376	3418	555	NW of H 2. borrow or midden area			0-.5'	Gunflint? Biface frag, possible gunflint frag	18.5	10.4	4.7	1	Sm. Biface or gunflint frag.
Florence B	337	3518	111	Small mound 45' east of site, old golf green			0-.5	Secondary flake, retouched	33.8	24.9	9.1	5.8	Retouched secondary flake, residual cortex
Florence B	132	4899		Surface south of road		S. of Road	Surf.	Tabular, potlid Flake Fragment	24.4	22.9	5	3.6	Flake Fragment, potlid
Florence B?	1	2307		Unknown				Arrow point	29.8	14.5	4.5	1.6	Side-notched arrow point, 2 pieces, tip broken
Florence ?	244	3645		418	6	Bell-shaped cache pit near entry	0-1.0'	Strike-a-light or wedge	42.3	25.9	8.7	10	Strike-a-light, or wedge

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
fossil wood	244	3648		418	6	Bell-shaped cache pit near entry	0-1.0'	pebble, broken	25.2	21.2	9.8	4.2	broken pebble, gravel cortex
Fossil wood	244	3665		418	6	Bell-shaped cache pit near entry		secondary flake, bipolar	20.1	10.2	3.6	0.9	bipolar secondary flake
Fossil Wood	475	5730			22	South Side	0-.5'	Primary flake	29.5	10.6	5.2	1.5	Primary flake, gravel cortex
Fossil wood	163	251	39	NW of H 2. borrow or midden area			0-.5'	FCR	48.3	27.8	17.9	28.1	FCR, fossil wood
Fossil wood	379	4609	584	NW of H 2. borrow or midden area			.5-1.0'	Primary flake	32.3	16.3	5.8	3.4	river gravel cortex, shovel nick
Fossil wood	337	3517	111	Small mound 45' east of site, old golf green			0-.5'	Gunflint, Native made	33.6	28.3	9.4	10.3	Gunflint, fossil wood, battered edge
French Flint	171	263			3	Floor		Gunflint	22.7	21.6	8.1	5.1	Gunflint, possibly French
French Flint	510	5824			5	Floor, F.D.#7		Gun flint	24.9	26.6	8.8	5	French Gun Flint
French Flint	312	3320		581	6			Gunflint	27.3	20.4	7.6	5.8	Chalcedony gunflint, French (Meusnes?)
French Flint	367	3345		623	7			Gun flint	24.5	21.1	7.4	5.95	French Gun Flint
French Flint	483	5922		2022 Borrow Pit for H23		South of south fence line		Gunflint	23.5	22.7	8.3	5.3	Gunflint, gray flint, French?
Green Quartzite, Bijou Hills?	171	89	31		3	floor	0-.5'	Tertiary flake	48.3	28.5	7	6	green quartzite
Obsidian	419	4616		Surface		Surf.	Surface	Secondary Flake	22.2	17.6	4.7	1.6	obsidian secondary flake
Obsidian ? Glass?	133	406	6	Fortif. wall test trench			0-.5'	Secondary flake	17.9	12.3	2.6	0.5	Obsidian or glass secondary flake
Penn.	171	88	31		3	floor	0-.5'	Tertiary flake	63.1	39.5	11	29.4	Tertiary flake, flake tool (nibbling on edge)
Penn.	156?	20	9 (?)	NW of H 2. borrow or midden area		Surf.	0-0.5'	Tertiary flake, retouched	21.6	17.8	3.9	1	Bifacial battering, strike-a-light?? Thin.

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Penn.	244	3661		418	6	Bell-shaped cache pit near entry		Secondary flake, modified	28.5	23.7	6.5	4.1	secondary flake, modified
Penn?	285	3140			6	Fill	0-1.0'	Tertiary flake	24.5	20.9	5.7	2.5	Tertiary flake, Pennsylvanian?
Penn?	685	7280		two provenience codes assigned	?	?	?	Tertiary Flake	16	11.3	2.7	0.5	Tertiary flake
Penn?	156?	17	9 (?)	NW of H 2. borrow or midden area		Surf.	0-0.5'	Secondary Flake	35.4	20.5	8.3	5.6	Secondary flake Prov. Info and what is on artifact don't match
Penn?	156?	14	9 (?)	NW of H 2. borrow or midden area		Surf.	0-0.5'	Tertiary flake side scraper, retouch on ventral	46.5	24.6	10.7	13.2	tertiary flake scraper
Quartzite	171	172			3	floor		Primary flake (from GS tool)	18.1	16.3	7.1	1.6	Primary flake from ground stone tool
Quartzite	171	171			3	floor		Primary flake, from ground stone tool	24.8	19.4	4.5	2.1	Primary flake from ground stone tool
Quartzite	189	1034		219	4		0-.5'	Secondary flake	44.3	22.6	7.3	6.9	Secondary flake
Quartzite	189	909		219	4		0.5-1.0'	Secondary flake from ground stone tool	46.6	28.4	11.1	11.2	Secondary flake from ground stone tool
Quartzite	92	619			4	floor		Primary flake from ground stone tool	86.6	51	20	96	Primary flake from ground stone tool
Quartzite	5	2649			4		0-.5'	Secondary Flake, ground stone piece	19.4	18.5	4.9	1.6	Flake spall from ground stone tool
Quartzite	501	5786			5		0-.5'	Primary flake, from pebble	16.5	11.7	4.3	1	Red Quartzite primary flake
Quartzite	565	6068			5	Surf., south side		Secondary flake, from maul?	54.4	22.8	10	12.5	Secondary flake, from maul?
Quartzite	343	3885		593 Depress. Between H5 & H6 entry				Secondary flake from ground stone tool	60.9	44.4	19	44.6	Secondary flake from ground stone tool
Quartzite	343	3886		593 Depress. Between H5 & H6 entry				Spall, from ground stone	39	33.1	6.5	9.5	Spall, from ground stone

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Quartzite	128	240	33	NW of H 2. borrow or midden area			0-.5'	Spall, hammer	60.8	66.9	20.4	103.9	Quartzite hammer spall, off grooved maul?
Quartzite	150	366	36	NW of H 2. borrow or midden area			1-1.5'	secondary flake	22.9	13.5	5.5	1.8	secondary flake
Quartzite (Dakota or green)	133	404			6		0-0.5'	Primary flake (From GS tool?)	40.8	30.9	5	6.8	Primary flake
Smoky Hill J.	174	1053		224	3			Scraper	88.1	39.9	16.8	62.8	Biface Scraper, polish, crushed edge
Smoky Hill J.	113	631			3	fill		secondary flake, proximal	22.4	20.2	11.1	4.8	Proximal end of secondary flake, possible radial fracture
Smoky Hill J.	43	3500		171	4			Scraper	87	40.1	17.8	81.5	Bifacial scraper, polish
Smoky Hill J.	69	2242		187	4			Scraper	76.9	56.4	12.3	56.3	Biface Scraper, beveled edge
Smoky Hill J.	75	699		194	4			Axe	113	58.9	19.9	205.2	SHJ Axe, chalky cortex
Smoky Hill J.	15	2412			4		0.5-1.0'	Primary flake	20.6	17.8	5.8	1.9	Primary flake, weathered cortex, burned/heated
Smoky Hill J.	15	2413			4		0.5-1.0'	Tertiary biface thinning flake	20.4	19	2.8	1	Biface thinning flake
Smoky Hill J.	15	2546			4		0.5-1.0'	Tertiary, Retouched flake	22.5	19.2	4.6	1.8	Retouched flake (on ventral)
Smoky Hill J.	421	4985			5	SW borrow pit		Axe/chopper	85.2	66.9	31.3	177.9	Axe, broken made into chopper
Smoky Hill J.	527	5877			5	North Sector	0-1'	Biface thinning flake	16.7	13.6	3.4	0.6	Biface thinning flake
Smoky Hill J.	501	5785			5		0-.5'	Bipolar Flake	25	20.1	5.6	1.9	Bipolar Flake
Smoky Hill J.	421	4982			5	SW borrow pit		Bipolar piece	27.3	14.3	12.1	6.4	beat up bipolar fragment
Smoky Hill J.	620	6108			5	west sector	0-1.0'	Blocky debris	25	16.3	8.3	3.4	blocky debris, burned
Smoky	501	5810			5		0-.5'	Blocky debris or shatter	26.4	14.6	8.1	2.3	Blocky debris or shatter

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Hill J.													
Smoky Hill J.	501	5790 -2			5		0-0.5'	Blocky debris or shatter. From burning	15.7	14.3	10.2	1.4	Blocky debris
Smoky Hill J.	501	5790 -1			5		0-0.5'	Radial, Cortex, no Platform, possibly radial fracture	13.7	10.8	4.4	0.6	Possible radial fracture, no platform. Potential burning
Smoky Hill J.	421	4984			5	SW borrow pit		Knife, beveled, Bifacial	86.1	52.2	11.9	56.7	bifacial beveled knife, lots of wear, chalky cortex, broken from larger piece
Smoky Hill J.	526	5883			5	SE Sector	0-.5'	Preform, Biface preform tip	16.5	22.2	5.5	1.9	Biface preform tip
Smoky Hill J.	513	5833			5	Found in entry	0-1'	Primary Flake	22.4	19	6.4	2.81	Flake Found in Entryway, Weathered cortex
Smoky Hill J.	620	6111			5	west sector	0-1.0'	Primary Flake	23.4	17.3	6.1	1.7	Tertiary SHJ flake, possibly burned
Smoky Hill J.	501	5765			5		0-0.5'	Tertiary, Proximal end of flake	15.8	15.3	4.4	0.9	Proximal end of flake, flat platform
Smoky Hill J.	421	4883			5	SW Borrow Pit		River Gravel with flakes removed	47.1	34.2	13.3	20.2	River Gravel Cortex
Smoky Hill J.	421	4884			5	SW borrow pit		Scraper, or graver flake tool	37.7	27.1	9.6	14.1	Matrix cortex
Smoky Hill J.	539	6454			5	SE sector	0-1.0'	Secondary decortication flake	22.6	17.2	4.1	1	secondary flake, red on one tip
Smoky Hill J.	505	5781			5		.5-1.0'	Secondary flake	22.8	15.8	7.1	2	Secondary flake with flat platform, pronounced bulb
Smoky Hill J.	421	5051			5	SW borrow pit		Secondary flake tool?	63.9	42.8	7.5	20.2	residual cortex, flake tool?
Smoky Hill J.	640	6662			5	post holes		Secondary flake, retouch, from biface	57.1	25.4	10.6	12.8	Residual cortex, from biface
Smoky Hill J.	421	4762			5	SW borrow pit		Tabular Fragment, SHJ, Flaked, smooth edge	93.9	61.8	27.1	155.1	Hide scraper, rubbing stone, chalky SHJ

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Smoky Hill J.	526	5888-2			5	SE sector	0-0.5'	Tertiary biface thinning flake	11.7	9.3	1.6	0.2	Tertiary biface thinning flake
Smoky Hill J.	526	5888-1			5	SE sector	0-0.5'	Tertiary flake	12.9	10.5	3.5	0.5	Tertiary flake, hinge/step termination, crushed platform
Smoky Hill J.	512	5844			5	East of entry	0-1.0'	Tertiary Flake	16.7	16.4	4.6	1.3	Tertiary Flake
Smoky Hill J.	678	6603			5	SE sector	0-1.0'	Tertiary Flake	21	18.3	3.6	1	Tertiary flake, possible Biface thinning, potlids
Smoky Hill J.	501	5811			5		0-.5'	Tertiary flake	16.2	11	1.6	0.3	Tertiary flake
Smoky Hill J.	513	5836			5	Near Entry	0-1.0'	Tertiary flake fragment	14.7	14.2	5.3	1.1	Tertiary flake fragment
Smoky Hill J.	527	6445			5	north sector	o-1.0'	Tertiary flake, Cortex on platform	23.4	17.8	5	1.3	Tertiary flake, river gravel cortex on platform
Smoky Hill J.	527	5876			5	North Sector	0-1.0'	Tertiary flake, flake tool	20.2	16.3	5.6	1.8	Flake Tool, Tertiary
Smoky Hill J.	421	4885			5	SW borrow pit		Tertiary flake, flake tool	35.9	32.8	7.9	9.7	Tertiary flake tool, distal end
Smoky Hill J.	527	6444			5	north sector	0-1.0'	Tertiary flake, proximal end	11.6	10.1	2.1	0.3	Tertiary flake, distal end radially broken
Smoky Hill J.	527	6602			5	north sector	0-1.0'	Tertiary flake, retouched	40	31.4	11.3	14.5	Retouched tertiary flake
Smoky Hill J.	527	6120			5	north sector	0-1.0'	Tertiary flake, retouched, from biface?	41.5	27.1	7.4	6.7	Retouch tertiary flake
Smoky Hill J.	421	4886			5	SW borrow pit		Tertiary, Biface thinning	26	22	3.6	1.7	Tertiary biface thinning with faceted/crushed platform, snap termination
Smoky Hill J.	632	6681			5	Store. Pit Fill		Biface fragment, tabular	70	43.8	18	62	Tabular biface fragment
Smoky Hill J.	244	3646		418	6	Bell-shaped cache pit near entry	0-1.0'	Blocky Debris, FCR	24.2	10.6	10.8	6	Fire-cracked
Smoky	244	3640		418	6	Bell-shaped		Dart Point base, Logan	26.1	11.5	6.2	1.6	Dart Point base, Logan Creek,

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Hill J.						cache pit near entry		Creek					stem width 18.8
Smoky Hill J.	244	2917 -2		418	6	Bell-shaped cache pit near entry		Secondary Flake	15.8	12.6	3.2	0.4	Secondary Flake, chalky cortex, snap/radial termination
Smoky Hill J.	244	3664		418	6	Bell-shaped cache pit near entry		Secondary Flake (off pebble), retouched	31.9	18.2	8.4	2.9	gravel cortex
Smoky Hill J.	244	3649		418	6	Bell-shaped cache pit near entry	0-1.0'	Tertiary Flake	29.1	17.1	5.7	2.5	Tertiary flake
Smoky Hill J.	278	3252		433	6			Knife, Biface Knife or scraper	84	60.6	21.7	100.4	Biface scraper or knife, polish
Smoky Hill J.	294	3344		441	6			Knife, biface knife fragment	33.4	27.4	7.8	8.9	Residual cortex
Smoky Hill J.	221	2808		466	6			scraper, biface on tabular piece	94.6	83.6	12.3	136.9	Scraper, biface on tabular piece
Smoky Hill J.	231	2783		468	6			knife, Biface Knife stem	42.2	27.9	7.4	6.4	Hafted biface stem and shoulder, round base, contracting stem
Smoky Hill J.	258	3634		479	6			Hoe, Biface Hoe w/ 4 refits	202	91.2	23.6	391.8	Biface hoe with 4 refit pieces, abraded, striations, chalky
Smoky Hill J.	658	2856		Area of 420	6		0-.5'	Bifacial flake	18.3	15.3	4.7	1.1	bifacial flake, residual cortex
Smoky Hill J.	658	2855		Area of 420	6		0-.5'	Gunflint? Modified Flake, edge fragment	24.1	14.1	7.2	1.9	Modified Flake
Smoky Hill J.	191	3121			6	Fill		Biface thinning flake, no platform	29.9	25	4.1	2.3	Biface thinning, no platform, some chalky cortex
Smoky Hill J.	201	3064			6	Along N-S mid-line	0-.5'	Blocky Debris	27.7	22.9	11.8	7.5	Blocky Debris, Shatter

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Smoky Hill J.	239	2798			6	SE ¼	0-0.5'	Blocky Debris	20.9	16	8.1	2.6	Blocky Debris with flake scar, burned, river gravel cortex
Smoky Hill J.	238	3674			6		0-0.5'	Blocky Debris	26.3	25.4	17	11.1	Blocky Debris/shatter, gravel cortex
Smoky Hill J.	285	3104			6	Fill	0-1.0'	Blocky Debris	25.1	14.9	9.3	2.3	Blocky Debris
Smoky Hill J.	286	3173			6	NW 1/4 Fill	0-.5'	Blocky Debris	24.5	22.7	8.6	5.2	Blocky Debris
Smoky Hill J.	263	2848			6	SW 1/4	0-.5'	Blocky Debris	24.8	14.8	8.3	2	Blocky debris
Smoky Hill J.	263	2896			6	SW 1/4	0-.5'	Blocky Debris with platform	14.8	9.9	6.2	0.6	Blocky debris, platform present
Smoky Hill J.	656	2811			6	2nd 10' square	0-.5	Blocky Debris, FCR	28.5	20	11	7.2	Fire-cracked
Smoky Hill J.	659	2861			6	3rd 10' square	0-0.5'	Blocky debris, shatter	14.7	13.6	5	0.7	Blocky debris or shatter
Smoky Hill J.	201	3073 -1			6	Along N-S mid-line	0-.5'	Blocky Debris, Splintered Piece	13.2	11.6	8.8	1.2	Blocky Debris
Smoky Hill J.	298	2963			6	south edge	0-1.0'	Blocky Debris, battered	28.4	22.1	10.2	7	residual/gravel cortex
Smoky Hill J.	238	2724			6		0-0.5'	Blocky Debris or shatter	18.2	17.4	8.3	2.3	Burned blocky debris
Smoky Hill J.	239	2760			6	SE 1/4	0-.5'	Blocky debris/split pebble?	23	18.1	8.1	2.5	river gravel cortex
Smoky Hill J.	201	3066			6	Along N/S mid-line	0-.5'	broken pebble	22.9	17.9	6.8	2.8	broken pebble
Smoky Hill J.	238	3084			6		0-.5'	Core	48.2	41.5	22.1	47.2	SHJ core, river gravel cortex
Smoky Hill J.	230	2935			6	west exc.	0-.5'	Primary flake	17.1	13.1	3.1	0.6	Primary flake, hinge termination, chalky cortex
Smoky Hill J.	305	3095			6	Post hole		Primary flake	16	13.9	3.8	0.8	Primary flake, river gravel cortex
Smoky	201	3070			6	Along N/S	0-.5'	Primary flake	16.8	15.2	3.4	1.1	Primary Flake, Weathered

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Hill J.						mid-line							cortex
Smoky Hill J.	238	3085			6		0-.5'	Secondary flake	36.1	27.6	14.3	16.7	Secondary flake, blocky, gravel cortex
Smoky Hill J.	194	3051			6	E 1/2	0-.5'	Secondary flake	28.5	23.8	8.3	4.9	Secondary flake, weathered/river gravel cortex, No Prov. Code
Smoky Hill J.	238	2746			6		0-.5'	Secondary Flake	12	11.5	2.9	0.3	Secondary flake, no platform, No Prov. Code
Smoky Hill J.	201	3069			6	Along N/S mid-line	0-.5'	secondary flake	22.2	18.6	5.3	1.6	secondary flake
Smoky Hill J.	285	3142			6	Fill	0-1.0'	Secondary flake	23	12.8	4.6	1.4	secondary flake, ground pltf
Smoky Hill J.	238	3087			6		0-.5'	Secondary Flake, blocky	24.7	21.6	10.2	5.7	gravel cortex
Smoky Hill J.	285	3134			6	Fill	0-1.0'	Spall, SHJ, thermal? Retouched?	76.7	75.6	13.7	84.4	Residual cortex
Smoky Hill J.	239	2796			6	SE 1/4	0-.5'	Tertiary flake	35	24.2	7.2	4.9	Tertiary flake, no platform, distal end radial break
Smoky Hill J.	194	3055			6	E 1/2	0-.5'	Tertiary flake	22.3	15	5.4	1.3	Ventral retouch, red on one tip
Smoky Hill J.	201	3072			6	Along N/S mid-line	0-.5'	Tertiary flake	20.7	17.1	4.5	1.6	tertiary flake
Smoky Hill J.	239	2769			6	SE ¼	0-0.5'	Tertiary flake fragment	11.4	7.5	4	0.2	Distal edge of tertiary flake
Smoky Hill J.	194	3058 -1			6		0-.5'	Tertiary flake, no platform, no cortex	11.6	9.8	1.5	0.2	Tertiary flake, no platform
Smoky Hill J.	201	3071			6	Along N/S mid-line	0-.5'	Tertiary flake, scraper retouch	23.3	13.7	7.2	2	scraper retouch
Smoky Hill J.	239	2761			6	SE ¼	0-.5'	Tertiary flake, tool edge	26.9	10.1	5.9	1.2	Tertiary flake, tool edge
Smoky Hill J.	229	2782			6	NE ¼	0-0.5	Secondary flake	13.5	9.2	3.2	0.2	Secondary flake

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Smoky Hill J.	363	3558			7		0-1.0'	Biface thinning, Utilized biface thinning flake	40.2	38.5	5	6	Utilized biface thinning flake
Smoky Hill J.	363	3562			7		0-1.0'	Retouched Gravel, bifacially retouched	54.1	28.7	13.6	20.4	Gravel (low quality), bifacially retouched
Smoky Hill J.	666	3598			7	east half of house	0-.5'	Secondary Flake	30.1	22	12	6.6	Secondary flake, residual weathered cortex
Smoky Hill J.	475	5729			22	south side	0-0.5'	Radial, Proximal end of flake, possible radial break	16.9	14.4	6.3	1.7	Proximal end of flake, possible radial break
Smoky Hill J.	460	5737			22	south side	0.5-1.0'	Tabular piece, blocky	20.6	13.3	7.6	1.9	Blocky flake, tabular
Smoky Hill J.	330	2967		594 depression in front of H5 entry				Arrow Point	22.4	13.5	3.8	0.8	Base and one ear missing
Smoky Hill J.	454	5344	5	2004		NE of site fence		Arrow point	15.9	13.7	3.1	0.6	Scallorn pt. stem and blade, corner notched, serrated edges
Smoky Hill J.	483	5921		2022 Borrow pit for H23 south of south fence				Radial, Biface thinning flake, No cortex, No platform, radial	24.5	14.3	3.2	0.9	Biface thinning flake radially broken, nibbling on edge
Smoky Hill J.	476	5612		2116 Burial area (same as Area 662)				Secondary flake, chalky cortex	31.6	19.4	6.3	3.4	Secondary SHJ flk with chalky cortex
Smoky Hill J.	626	6215		2197 Trash-filled pit b/w H3 and H12			0-0.5'	Scraper, on tertiary flake	48.7	48.8	8.9	17.1	Convex, unifacial edge scraper on tertiary flake
Smoky Hill J.	331	4128	107	4.7' W of west fence, 14.7' N of old turnstile			0-1.0'	Biface Fragment, mid section	25.7	16.3	8.6	3.8	Biface Fragment, potlids
Smoky Hill J.	320	3159 -2	105	Burial area 400 yards N of site				Blocky debris or shatter	13.4	7.7	6.1	0.5	SHJ blocky debris/shatter

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Smoky Hill J.	320	3165	105	Burial area 400 yards N of site				Biface thinning, Expanding flake, possible biface thinning	17	12.8	3.6	0.7	Probable SHJ biface thinning flake
Smoky Hill J.	320	3159 -1	105	Burial area 400 yards N of site				Radial, No cortex, No platform	13.9	10.4	2.3	0.3	Triangular flake, no cortex or platform, radial
Smoky Hill J.	318	3214		Burial Area 662			Surface	Scraper, uniface nosed	40.3	37.6	11.6	11.3	Flake tool, nosed scraper, polish on distal
Smoky Hill J.	322	3264		Burial Area 662		Fill	0-1.0'	Secondary flake	29	22.9	5.2	3.3	Secondary flake, polish on distal
Smoky Hill J.	322	3265		Burial Area 662		Fill	0-1.0'	Secondary flake	15.6	15	4	0.9	Secondary flake, red near platform (burning). Crushed platform, chalky cortex
Smoky Hill J.	322	3267		Burial Area 662		Fill	0-1.0'	Tertiary flake	24.6	17.2	5.1	2.3	Tertiary flake
Smoky Hill J.	318	3205		Burial Area 662			Surf.	Tertiary flake, crushed dorsal surface near platform	28.9	22.3	7.2	2.9	Tertiary flake with crushed dorsal surface near platform
Smoky Hill J.	322	3266		Burial Area 662		Fill	0-1.0'	Tertiary flake, flat platform	31.3	25.8	5.7	3.2	Tertiary flake, flat platform, hinge termination
Smoky Hill J.	322	3218		Burial Area 662		Fill	0-1.0'	Tertiary Flake, No Platform	11.6	11.1	2.1	0.2	Tertiary Flake, no platform, no cortex
Smoky Hill J.	322	3216		Burial Area 662		fill	0-1.0'	Tertiary flake, no platform or cortex	19.9	14.1	3.8	0.9	no platform or cortex
Smoky Hill J.	315	3302		Burial Area 662 test trench			0-.5'	End scraper, on tertiary flake	24	22.3	7.2	4	End Scraper
Smoky Hill J.	315	3303		Burial Area 662 test trench			0-0.5'	Biface thinning, expanding flake, red proximal end	19.3	14.9	4	0.9	Expanding flake, possible biface thinning with red proximal end
Smoky Hill J.	321	3000		Burial Area 662, F584		Fill		Biface flake	24.6	13.8	6.7	1.1	biface flake
Smoky Hill J.	170	886		Burial Test Pit		Surf.		Biface blade fragment	17.1	15.2	4.9	0.9	biface blade fragment
Smoky	170	885		Burial		Surf.		Bifacial edge	30.2	14	11.6	3.9	River gravel

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Hill J.				Test Pit									cortex?
Smoky Hill J.	170	1091		Burial Test Pit			Surf.	Blocky debris or shatter	35.9	12.6	10.1	3.1	SHJ blocky debris
Smoky Hill J.	170	884		Burial Test Pit			Surf.	Secondary Flake	29.5	20.4	10.4	5.9	Flake with nibbling on left lateral edge, Weathered cortex
Smoky Hill J.	170	889		Burial Test Pit			Surf.	Secondary Flake, from scraper edge?	22.7	16.6	7.5	2.4	Secondary flake
Smoky Hill J.	170	1092		Burial Test Pit		Surf.		secondary flake, retouched	16.6	16.1	6.3	1.5	River gravel cortex
Smoky Hill J.	170	1089		Burial Test Pit			Surf.	Tabular Fragment, one flake removed	63.4	44.6	34.2	102.3	Tabular fragment, one flake removed
Smoky Hill J.	170	890		Burial Test Pit		Surf.		Tabular fragment, SHJ	101.1	88.5	24.9	343.2	Tabular cobble, SHJ, flaked, polished
Smoky Hill J.	170	888		Burial Test Pit			Surf.	Tertiary Flake	26.2	20.9	5.5	2.3	Near cortex tertiary flake, no platform, no Prov. Code
Smoky Hill J.	170	1090		Burial Test Pit			Surf.	Tertiary flake, no platform or cortex	20.9	14.5	4.6	1.4	Tertiary flake, no platform, no cortex
Smoky Hill J.	313	2980		Burial. 605/606		Burial # 1		Tertiary Flake	28	23.7	7.9	5	Tertiary flake
Smoky Hill J.	462	5653	34	East Side of fenced area, parking lot			0-0.5'	Tabular piece with several flakes removed	53	31	12.6	16.3	Tabular SHJ fragment, several flakes removed
Smoky Hill J.	461	5753	Near 32	East Side of fenced area, parking lot			Surf.	Biface	44.2	41.7	8.6	20.8	Midsection of lrg. Biface
Smoky Hill J.	143	326	25	NW of H 2. borrow or midden area			.5-1.0'	Projectile Point preform fragment	31.9	30.5	6.8	7.4	Projectile point preform, strike-a-light?
Smoky Hill J.	361	4172	544	NW of H 2. borrow or midden area			0-1.0'	Gunflint on strike-a-light	42.3	32.7	10	12.7	Irregular gunflint or strike-a-light
Smoky Hill J.	387	4364	573	NW of H 2. borrow or midden area			0-.5'	Secondary Flake	30.2	25.2	8.1	5.7	Secondary flake, river gravel cortex

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Smoky Hill J.	405	4450	586	NW of H 2. borrow or midden area				Gunflint fragment ?	30.3	15.1	8.3	3.6	gunflint fragment ?
Smoky Hill J.	405	5123	586	NW of H 2. borrow or midden area				Tertiary flake, retouched	32.1	31.5	5.4	5.3	tertiary flake, retouched
Smoky Hill J.	396	4051	593	NW of H 2. borrow or midden area				Knife, Biface knife, proximal or distal	77	50.8	16.1	61.7	Biface knife
Smoky Hill J.	333	3729	109	Pit 35.7' N of iron fence and 100' W of access road			0-.5'	Blocky Debris	19.3	7.1	6.7	0.9	Blocky Debris
Smoky Hill J.	333	3727	109	Pit 35.7' N of iron fence and 100' W of access road			0-0.5'	Tabular SHJ fragment. Possible radial fracture	32.6	17.1	8.8	2.8	Tabular SHJ fragment
Smoky Hill J.	335	3423	110	Small mound 45' east of site, old golf green			.5-1'	Tertiary Flake	30.8	27.1	9.9	6.1	Tertiary flake, close to cortex
Smoky Hill J.	340	3440	113	Small mound 45' east of site, old golf green			0-0.5'	Secondary Flake	29.4	24.6	6.7	4.2	Secondary Flake
Smoky Hill J.	419	6875		Surface			Surf.	Biface thinning flake, flat platform	42.8	29.2	7.4	6.4	Biface thinning flake with flat platform, 1 dorsal scar
Smoky Hill J.	429	5338	1	W side of casement road, northeast of A671			0-.3'	Tertiary flake, in 3 pieces	10	10	3.7	0.4	3 small fragments, refit
Smoky Hill J.	430	5377	2	W side of casement road, northeast of A671			0-.3'	Retouched Flake fragment	17.8	12.3	4.6	0.7	Retouched flake fragment, potlids
Smoky Hill J.	217	2932		411	6			Arrow point	16.9	13.1	3.7	0.8	Arrow point corner notched, scallorn (purple-brown fossil. Chert)
Smoky Hill J.	133	405	6	Fortification wall test trench			0-.5'	Secondary decortication flake	16.4	13.1	8.2	1.9	Secondary flake

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Sioux Quartzite	113	879			3	Fill		Secondary flake fragment, from maul?	28	21.2	4.4	2.4	Secondary flake fragment
Sioux Quartzite	113	869			3	Fill		Spall, Sioux Quartzite, from maul?	40.9	35.7	8.6	11.5	Sioux Quartzite spall, from GS tool, possible maul?
Sioux Quartzite	113	880			3	Fill		Spall, Sioux Quartzite, from maul?	19.9	15.6	4.3	1.3	Sioux Quartzite spall, from GS tool, possible maul?
Sioux Quartzite	189	1033		219	4		0-.5'	Tertiary flake, from ground stone tool?	71.4	44.7	24.9	57.5	Tertiary flake
Sioux Quartzite	565	6067			5	Surf. south side		Spall from ground stone tool?	59.9	50.3	28.1	58.9	Spall, from ground stone
Sioux Quartzite	253	2884		478	6		0-.5'	secondary flake, from ground stone	76.1	73.9	20.4	90.9	Secondary flake from maul?
Sioux Quartzite	298	2962			6	south edge	0-1'	secondary flake, from ground stone	92.9	77.4	23.3	127.2	Secondary flake, from maul?
Sioux Quartzite	229	2865			6	NE 1/4	0-.5'	Secondary Flake, from maul?	45.6	27.6	7.7	10.5	Secondary flake from maul?
Sioux Quartzite	459	5648	32	East Side of fenced area (where parking lot is now)			0-0.5'	Tertiary flake, from ground stone tool?	76.9	67.6	29.1	125	Tertiary flake
Sioux Quartzite	83	2460	5	Exterior Cache Pit of H4				primary flake, from ground stone tool?	30.8	17.6	3.6	1.5	Primary flake from ground stone tool
Sioux Quartzite	128	239	33	NW of H 2. borrow or midden area			0-.5'	Secondary flake from ground stone	80.9	53.9	20.8	92.9	Secondary flake from ground stone tool?
Sioux Quartzite	128	2432	33	NW of H 2. borrow or midden area			0-0.5'	Secondary flake from ground stone, Maul fragment?	26.7	19	6.5	3.2	Secondary flake from maul?
Sioux Quartzite	128	244	33	NW of H 2. borrow or midden area			0-.5'	Tertiary Flake	31.8	27.4	5.7	4.6	Tertiary flake, No prov. Code
Sioux Quartzite	164	2284	40	NW of H 2. borrow or midden area			0-.5'	Primary flake, from ground stone tool?	50.9	24.4	21.5	22.1	Primary flake from ground stone tool
Sioux Quartzite	132	7196				Surf. south of road		Secondary flake from ground stone tool	72.2	64.2	30.3	111	Secondary flake from ground stone tool, ventral flaking, polish

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Unid.	654	2674			4		0.5-1.0'	gunflint?	26.8	26.2	6.3	4.8	Gunflint ? Burned
Unid.	501	5800			5		0-0.5'	broken pebble	20.5	19.5	11	4.4	river gravel cortex
Unid.	239	2762			6	SE 1/4	0-.5'	Bipolar pebble	18.1	15.8	8.4	2.5	bipolar pebble
Unid.	230	2942			6	west exc.	0-.5'	Pebble	20.9	18.6	7.1	2.7	Pebble, gravel cortex
Unid.	229	2780			6	NE 1/4	0-.5'	Primary flake	17.3	12.8	3.9	0.7	river gravel cortex
Unid.	239	2800			6	SE 1/4	0-.5'	Primary flake	20.6	12	5.4	1.2	gravel cortex
Unid.	156	15	9	NW of H 2. borrow or midden area		Surf.	0-0.5'	Retouched flake (on ventral)	43.5	29.1	9.8	13.8	Matrix cortex
Unid.	128	205	33	NW of H 2. borrow or midden area			0-.5'	Gunflint, irregular	27.6	22	6.2	4.3	unidentified white chert, novaculite?, gunflint fragment
Unid. French?	113	732			3	Fill		Gunflint fragment	20.4	16.4	6.5	3	Possible gunflint fragment
Unid. SHJ?	421	4983			5	SW borrow pit		Secondary, rejuvenation flake	38.9	28.9	10.5	8.5	Chalky UC chert
Unid.	506	5816			5	floor, F.D.#3		Split river cobble	62	44.6	13	45.1	Split river cobble (refits with 5860)
Unid.	509	5860			5	floor, F.D.#6		Split river cobble	65.7	42.6	17.2	52	Split river cobble (refits with 5816)
Unid.	108	864			3	bench top fill		pebble, broken	14.7	13.4	3.6	0.8	broken pebble
Unid.	513	5835			5	Near Entry	0-1.0'	Blocky Debris, river gravel	22.4	18.4	8.9	3.2	Blocky debris, river gravel
Unid.	501	5770			5		0-.5'	Pebble, Flaked pebble	24.8	19.6	11.5	9.2	flaked pebble, river gravel cortex
Unid.	513	5834			5	Near Entry	0-1.0'	Secondary Flake, river pebble	23.8	21.3	7.8	4.5	River gravel secondary flake
Unid.	527	6432			5	north sector	0-1.0'	Tertiary flake fragment	22	12.7	5.3	0.9	Tertiary flake fragment
Unid.	238	2744			6		0-.5'	bipolar fragment	30.7	22.2	14.6	7.1	Bipolar fragment, river gravel cortex
Unid.	201	3065			6	Along N/S mid-line	0-.5'	Bipolar pebble	37.2	19.8	10.4	6.5	Bipolar pebble, river gravel cortex

Material	Prov	Spec #	X-unit	Fea.	H	Sub-unit	El	Artifact Type	Max L	Max W	Max T	Wgt	Notes
Unid.	201	3067			6	Along N/S mid-line	0-.5'	Blocky Debris	27.1	26.2	11.1	6.3	Unidentified chert, river gravel
Unid.	201	3068			6	Along N/S mid-line	0-.5'	Blocky Debris	25.7	16.5	8.9	3.2	Blocky Debris, river gravel
Unid.	238	2723			6		0-.5'	Blocky debris/FCR	19.4	13.7	7.6	3	FCR, gravel cortex
Unid.	354	3799			7	Bench Area, South edge		Tertiary flake	25.8	15.5	5	2.1	Tertiary Flake, White Chalcedony, Ogallala, WRG?
Unid.	156	16	9	NW of H 2. borrow or midden area		Surf.	0-0.5'	Fire-cracked	38.3	30.3	25.9	34.3	Fire-cracked
Unid.	156	13	9	NW of H 2. borrow or midden area			0-0.5'	Primary flake	33.7	27.4	9.6	8.4	River gravel primary flake
Unid.	405	4449	586	NW of H 2. borrow or midden area				Gunflint	24.3	18.6	5.5	3.2	Gunflint, French? Gray, mottled.
Unid.	156	12	9	NW of H 2. borrow or midden area		Surf.	0-0.5'	Secondary flake, with holes	58.5	34.2	12.6	14.7	Possibly utilized, possibly Laverne Chert, river gravel cortex
Unid.	626	6557		2197 trash-filled pit b/w H3 &H12			0-0.5'	Gunflint	28.3	27.6	9.9	8.3	Gunflint, gray mottled flint, fossiliferous French? Penn?

APPENDIX

Chipped Stone Databases

Table 3: 14RP1 House 13 Sixteenth-Inch Water Screen and Flotation Chipped Stone from 2008 Excavations.

Specimen #	Length	Width	Thick	Weight	Platform	Material	Notes	Recovery
4183-CS-3	6	4	1.1	<0.01	YES	Alibates	strike-a-light or gunflint flake	1/16" WS
4296-CS-1	6	4	0.7	<0.01	NO	Alibates	strike-a-light or gunflint flake	1/16" WS
3268-CS-2	4	3	0.9	<0.01	YES	Alibates	tool retouch	1/16" WS
3286-CS-2	6	5	1.6	0.04	NO	Alibates	strike-a-light flake?	1/16" WS
3688-CS-1	4	4	0.9	<0.01	NO	Alibates		1/16" WS
3768-CS-1	6	2	1.1	<0.01	IN	Alibates		1/16" WS
3866-CS-14	4	3	1.2	<0.01	NO	Alibates		1/16" WS
3966-CS-1	6	4	0.9	0.02	NO	Alibates		1/16" WS
3768-CS-5	1.9	1.6	0.3	<0.01	YES	Alibates	from gunflint?	1/16" WS
3161-CS-2	9	6	2.2	0.08	YES	Alibates?	burned	1/16" WS
3795-CS-11	7	7	1.3	0.06	YES	Alibates?	Biface thinning	1/16" WS
3212-CS-5	6.3	4.6	1.1	0.02	YES	Alibates	tool retouch	1/16" WS
3315-CS-3	6.9	4.9	1.3	0.02	YES	Basalt		1/16" WS
3875-CS-1	5	3.1	1.3	<0.01	YES	Basalt		1/16" WS
3311-CS-2	5	5	0.7	0.01	YES	Boone/Reed Springs	tool retouch	1/16" WS
4137-CS-1	6	3	0.9	<0.01	NO	Boone/Reed Springs		1/16" WS
3315-CS-5	2.6	2.2	0.3	<0.01	YES	Boone/Reed Springs?		1/16" WS
3161-CS-3	7	5	1.6	0.03	YES	Chalcedony, Unidentified		1/16" WS
3723-CS-2	6	3	1.5	<0.01	NO	Chalcedony?		1/16" WS
3909-CS-8	4.4	4.4	1	0.02	YES	Chalcedony?	tool retouch	1/16" WS
3161-CS-4	10	6	2.3	0.09	NO	Florence	burned	1/16" WS
3166-CS-2	6	4	0.8	<0.01	NO	Florence		1/16" WS
3274-CS-1	5	4	0.6	<0.01	NO	Florence		1/16" WS
3282-CS-3	5	5	0.9	<0.01	NO	Florence		1/16" WS
3286-CS-1	11	8	1.2	0.08	NO	Florence	heated	1/16" WS
3311-CS-1	6	5	1.1	<0.01	NO	Florence		1/16" WS
3319-CS-4	6.6	5.6	1.4	0.02	YES	Florence		1/16" WS
3409-CS-1	8	5	1.2	0.05	YES	Florence	tool retouch	1/16" WS
3409-CS-9	9	5	0.8	0.03	NO	Florence		1/16" WS
3445-CS-3	4	2	0.5	<0.01	NO	Florence		1/16" WS
3455-CS-1	9	5	1.8	0.04	YES	Florence		1/16" WS
3626-CS-1	5	3	2.9	0.04	NO	Florence		1/16" WS
3671-CS-9	3	1.9	0.6	<0.01	NO	Florence		1/16" WS
3678-CS-2	4.1	2.2	0.4	<0.01	No	Florence		1/16" WS
3678-CS-4	4.5	3.8	0.9	<0.01	YES	Florence	tool retouch	1/16" WS
3705-CS-12	4.3	2.3	0.5	<0.01	NO	Florence		1/16" WS
3705-CS-9	2	2	0.4	<0.01	NO	Florence		1/16" WS
3790-CS-12	3.6	1.9	0.5	<0.05	YES	Florence		1/16" WS
3790-CS-5	4	3	1.7	<0.01	Yes	Florence	strike-a-light flake?	1/16" WS

Specimen #	Length	Width	Thick	Weight	Platform	Material	Notes	Recovery
3790-CS-8	3	2	0.4	<0.01	NO	Florence		1/16" WS
3795-CS-24	9.1	7.9	2.1	0.1	IN	Florence	burned	1/16" WS
3866-CS-12	7	4	1.2	0.02	YES	Florence		1/16" WS
3866-CS-16	6	6	0.6	<0.01	NO	Florence		1/16" WS
3866-CS-17	4	3	0.7	<0.01	NO	Florence		1/16" WS
3866-CS-18	6	4	1.3	0.02	NO	Florence		1/16" WS
3909-CS-2	4.2	2	0.4	<0.01	NO	Florence		1/16" WS
3909-CS-4	2.9	1.6	0.7	<0.01	No	Florence		1/16" WS
3971-CS-3	4	2	0.3	<0.01	NO	Florence		1/16" WS
4029-CS-3	11	6	1.1	0.07	YES	Florence	Biface thinning	1/16" WS
4202-CS-1	5	4	1.1	<0.01	NO	Florence		1/16" WS
4488-CS-1	5	4	1.4	0.02	YES	Florence	tool retouch	1/16" WS
3718-CS-3	3	2.6	0.4	<0.01	YES	Florence	tool retouch, strike-a-light flake?	1/16" WS
4047-CS-4	10	7	2.7	0.16	Yes	Fossil Wood		1/16" WS
3795-CS-12	7	6	1.7	0.05	YES	French? SHJ?		1/16" WS
3118-CS-5	3	2	0.2	<0.01	NO	Unidentified		Flotation
3161-CS-5	10	7	1.5	0.06	NO	Unidentified	burned, refit with 3161-CS-6	1/16" WS
3161-CS-6	7	6	2.2	0.07	NO	Unidentified	burned, refit with 3161-CS-5	1/16" WS
3212-CS-3	9	3.4	1.2	0.03	NO	Unidentified	oxidized residue	1/16" WS
3296-CS-1	5.1	3.9	0.8	<0.01	YES	Unidentified	tool retouch	1/16" WS
3307-CS-2	4	4	1.2	0.02	NO	Unidentified		1/16" WS
3319-CS-7	4.2	3.8	1.2	<0.01	NO	Unidentified		1/16" WS
3718-CS-1	4	4	0.3	<0.01	NO	Unidentified		1/16" WS
3790-CS-10	2.5	1.9	0.7	<0.01	NO	Unidentified	burned	1/16" WS
3790-CS-11	1.5	1.3	0.5	<0.01	NO	Unidentified	burned	1/16" WS
3790-CS-3	5	3	0.8	<0.01	NO	Unidentified	burned	1/16" WS
3790-CS-4	3	2	0.9	<0.01	YES	Unidentified	small retouch	1/16" WS
3790-CS-7	3	2	0.4	<0.01	NO	Unidentified		1/16" WS
3790-CS-9	2	2	0.4	<0.01	YES	Unidentified		1/16" WS
3795-CS-7	6	4	1.1	0.02	YES	Unidentified	Biface thinning	1/16" WS
3905-CS-7	6.8	4.7	2	0.05	NO	Unidentified	Burned	1/16" WS
3914-CS-4	4.9	3.3	0.6	<0.01	YES	Unidentified	Two fragments, refit, burned	1/16" WS
4075-CS-2	7	6	1.2	0.03	YES	Unidentified	burned	1/16" WS
3768-CS-6	2.2	1.9	0.6	<0.01	No	Unidentified	potlid	1/16"WS
4137-CS-3	6	5	0.7	<0.01	NO	Obsidian		1/16" WS
3686-CS-2	5	5	0.8	0.03	NO	Permian		1/16" WS
4306-CS-1	6	6	2	0.04	YES	Permian		1/16" WS
3212-CS-4	5.3	3.5	0.9	0.02	YES	Permian	tool retouch, strike-a-light flake?	1/16" WS
3692-CS-13	4	3.8	0.2	<0.01	YES	Permian		1/16" WS
4183-CS-8	5.2	5.1	1.3	0.02	YES	Permian	tool retouch	1/16" WS

Specimen #	Length	Width	Thick	Weight	Platform	Material	Notes	Recovery
3118-CS-3	5	3	0.9	<0.01	NO	Quartzite		Flotation
3118-CS-4	4	3	0.9	<0.01	IN	Quartzite		Flotation
3282-CS-1	10	5	1.4	0.08	NO	Quartzite		1/16" WS
3455-CS-3	3	2	0.5	<0.01	IN	Quartzite		1/16" WS
3705-CS-1	4	3	0.9	<0.01	NO	Quartzite		1/16" WS
3156-CS-4	6	4	1.4	0.03	NO	QZT (Bijou)		1/16" WS
3409-CS-5	7	5	1.3	0.04	YES	QZT (Bijou)	tool retouch	1/16" WS
3409-CS-8	7	5	0.8	0.02	NO	QZT (Bijou)		1/16" WS
3633-CS-1	8.8	7.1	3.3	0.14	NO	QZT (Bijou)		1/16" WS
3692-CS-3	10	6	2.3	0.13	NO	QZT (Bijou)		1/16" WS
3774-CS-4	4	4	1.2	<0.01	YES	QZT (Bijou)		1/16" WS
3866-CS-15	7	6	1.6	0.04	YES	QZT (Bijou)	Biface thinning	1/16" WS
3307-CS-4	5	4	0.8	0.01	NO	Quartzite (Dakota?)		1/16" WS
3671-CS-4	5	5	1.7	0.03	NO	QZT (Sioux)	thermal?	1/16" WS
3671-CS-6	5	3	1.1	<0.01	NO	QZT (Sioux)	thermal?	1/16" WS
3286-CS-6	6	4	1	0.03	NO	Quartzite?		1/16" WS
3286-CS-8	4	3	1.1	<0.01	NO	Quartzite?		1/16" WS
3718-CS-2	5.4	4.7	1	0.02	NO	Smoky Hill J.		1/16" WS
3725-CS-1	5	4	0.5	<0.01	YES	Smoky Hill J.	tool retouch	Flotation
3118-CS-1	10	6	2.7	0.15	NO	Smoky Hill J.		Flotation
3118-CS-2	6	5	0.9	0.04	NO	Smoky Hill J.		Flotation
4547-CS-1	4.8	1.8	1.7	0.01	NO	Smoky Hill J.	polish	1/16" WS
3423-CS-1	6	5	2.6	0.04	Yes	Smoky Hill J.		1/16" WS
3423-CS-2	7	5	1.3	0.05	No	Smoky Hill J.		1/16" WS
3686-CS-1	6	5	1.1	<0.01	NO	Smoky Hill J.		1/16" WS
3684-CS-1	7.5	5.3	1.7	0.06	IN	Smoky Hill J.		1/16" WS
4047-CS-1	7	5	0.9	0.02	NO	Smoky Hill J.		1/16" WS
4047-CS-2	8	5	1.6	0.06	NO	Smoky Hill J.		1/16" WS
4047-CS-3	5	4	1	<0.01	YES	Smoky Hill J.	tool retouch, strike-a-light flake?	1/16" WS
4183-CS-1	6	5	1.3	0.03	IN	Smoky Hill J.		1/16" WS
4183-CS-2	7	5	1.7	0.03	YES	Smoky Hill J.		1/16" WS
4183-CS-4	5	4	0.5	<0.01	NO	Smoky Hill J.		1/16" WS
4183-CS-5	4	4	0.9	<0.01	YES	Smoky Hill J.	tool retouch, strike-a-light flake?	1/16" WS
4183-CS-6	4	3	0.6	<0.01	IN	Smoky Hill J.		1/16" WS
4183-CS-7	3	2.6	0.2	<0.01	NO	Smoky Hill J.		1/16" WS
4283-CS-1	5	4	0.7	<0.01	NO	Smoky Hill J.		1/16" WS
4292-CS-1	9	6	2.4	0.1	YES	Smoky Hill J.	refits with 4292-CS-2, BT split through platform	1/16" WS
4292-CS-2	9	8	2.5	0.15	YES	Smoky Hill J.	refits with 4292-CS-1, BT split through platform	1/16" WS
4302-CS-1	3	1	0.4	<0.01	NO	Smoky Hill J.		1/16" WS
3145-CS-1	8	8	2.1	0.11	NO	Smoky Hill J.		1/16" WS

Specimen #	Length	Width	Thick	Weight	Platform	Material	Notes	Recovery
3145-CS-2	7	6	1.4	0.05	NO	Smoky Hill J.		1/16" WS
3145-CS-3	5	4	7	<0.01	NO	Smoky Hill J.		1/16" WS
3145-CS-4	5	3	0.5	<0.01	NO	Smoky Hill J.		1/16" WS
3156-CS-1	7	6	0.9	0.03	NO	Smoky Hill J.	Biface thinning	1/16" WS
3156-CS-2	7	7	1	0.05	YES	Smoky Hill J.	Biface thinning, burned	1/16" WS
3156-CS-5	6	5	0.7	0.01	NO	Smoky Hill J.		1/16" WS
3156-CS-6	6	5	0.8	0.02	NO	Smoky Hill J.		1/16" WS
3161-CS-1	7	5	1.2	0.02	IN	Smoky Hill J.	burned	1/16" WS
3161-CS-7	4	3	0.9	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3161-CS-8	3	2	0.3	<0.01	IN	Smoky Hill J.	small tool retouch	1/16" WS
3166-CS-1	6	6	1	0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3171-CS-1	5	5	0.7	<0.01	NO	Smoky Hill J.		1/16" WS
3171-CS-2	9	4	1.3	0.03	YES	Smoky Hill J.		1/16" WS
3171-CS-3	5	4	0.3	<0.01	NO	Smoky Hill J.		1/16" WS
3212-CS-1	5	4	0.8	0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3212-CS-2	8	5	1.5	0.09	NO	Smoky Hill J.		1/16" WS
3268-CS-1	4	4	0.9	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3268-CS-3	4	3	0.3	<0.01	NO	Smoky Hill J.		1/16" WS
3274-CS-2	3	3	0.2	<0.01	NO	Smoky Hill J.		1/16" WS
3274-CS-3	6	5	1.3	0.03	NO	Smoky Hill J.		1/16" WS
3278-CS-1	9.3	5.8	1.1	0.06	NO	Smoky Hill J.		1/16" WS
3282-CS-2	3	3	0.7	<0.01	YES	Smoky Hill J.		1/16" WS
3282-CS-4	6	5	0.8	<0.01	NO	Smoky Hill J.		1/16" WS
3286-CS-3	6	5	0.4	<0.01	NO	Smoky Hill J.		1/16" WS
3286-CS-4	7	3	1.3	0.02	NO	Smoky Hill J.		1/16" WS
3286-CS-5	8	4	1.2	0.03	YES	Smoky Hill J.		1/16" WS
3286-CS-7	5	3	0.8	<0.01	NO	Smoky Hill J.		1/16" WS
3292-CS-1	7	6	1.8	0.06	NO	Smoky Hill J.		1/16" WS
3292-CS-2	5	5	0.6	<0.01	NO	Smoky Hill J.		1/16" WS
3292-CS-3	5	4	1	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3292-CS-4	5	4	1.1	<0.01	NO	Smoky Hill J.		1/16" WS
3292-CS-5	7	6	0.7	<0.01	NO	Smoky Hill J.		1/16" WS
3292-CS-6	5	4	0.8	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3292-CS-7	5	4	1.6	<0.01	NO	Smoky Hill J.	radial	1/16" WS
3292-CS-8	6.2	6	2	0.04	YES	Smoky Hill J.	tool retouch	1/16" WS
3307-CS-3	6	5	0.7	0.02	NO	Smoky Hill J.		1/16" WS
3307-CS-5	5	4	0.8	0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3311-CS-3	8	5	1.5	0.06	YES	Smoky Hill J.	Biface thinning	1/16" WS
3311-CS-4	5	3	1.3	0.02	NO	Smoky Hill J.		1/16" WS
3315-CS-1	6	3	0.9	<0.01	NO	Smoky Hill J.	burned	1/16" WS
3315-CS-2	6	6	2.7	0.06	YES	Smoky Hill J.	battered plt, strike-a-light flake?	1/16" WS
3315-CS-4	3.3	2.5	0.7	<0.01	YES	Smoky Hill J.	small retouch, strike-a-light flake?	1/16" WS

Specimen #	Length	Width	Thick	Weight	Platform	Material	Notes	Recovery
3319-CS-1	6	4	0.8	0.02	NO	Smoky Hill J.		1/16" WS
3319-CS-2	7	5	0.9	0.03	NO	Smoky Hill J.		1/16" WS
3319-CS-3	6	4	0.8	<0.01	NO	Smoky Hill J.		1/16" WS
3319-CS-5	4.8	1.9	0.6	<0.01	NO	Smoky Hill J.		1/16" WS
3319-CS-6	6.4	5.1	0.8	0.02	NO	Smoky Hill J.		1/16" WS
3319-CS-8	3	2.9	0.7	<0.01	YES	Smoky Hill J.		1/16" WS
3347-CS-1	4	3	0.6	<0.01	YES	Smoky Hill J.		1/16" WS
3347-CS-2	5	1	0.5	<0.01	NO	Smoky Hill J.		1/16" WS
3351-CS-1	5	4	0.6	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3351-CS-2	7	3	0.8	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3351-CS-3	8	4	1.2	0.04	YES	Smoky Hill J.	tool retouch	1/16" WS
3409-CS-10	4.3	4.2	0.6	<0.01	YES	Smoky Hill J.		1/16" WS
3409-CS-2	5	4	1	<0.01	NO	Smoky Hill J.		1/16" WS
3409-CS-3	4	3	0.7	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3409-CS-4	7	3	1.2	<0.01	IN	Smoky Hill J.	burned	1/16" WS
3409-CS-6	7	5	0.8	0.02	YES	Smoky Hill J.	tool retouch	1/16" WS
3409-CS-7	3	3	0.9	<0.01	NO	Smoky Hill J.	burned	1/16" WS
3427-CS-1	5	4	0.7	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3427-CS-3	7	4	0.7	<0.01	NO	Smoky Hill J.		1/16" WS
3445-CS-1	5	4	1.3	0.02	YES	Smoky Hill J.		1/16" WS
3445-CS-2	14	10	4.4	0.51	YES	Smoky Hill J.	Biface thinning * too big for 1/16" WS	1/16" WS
3445-CS-4	6	3	1	<0.01	NO	Smoky Hill J.		1/16" WS
3626-CS-2	3	3	0.4	<0.01	NO	Smoky Hill J.		1/16" WS
3671-CS-1	4	2	1.1	<0.01	NO	Smoky Hill J.		1/16" WS
3671-CS-10	9.8	4.7	0.8	0.04	NO	Smoky Hill J.		1/16" WS
3671-CS-2	6	5	2	0.03	YES	Smoky Hill J.	Biface thinning	1/16" WS
3671-CS-3	6	5	1	0.03	NO	Smoky Hill J.		1/16" WS
3671-CS-5	5	4	0.8	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3671-CS-7	7	4	2	0.03	NO	Smoky Hill J.	burned	1/16" WS
3671-CS-8	4	3	1.1	<0.01	NO	Smoky Hill J.		1/16" WS
3678-CS-1	7.6	6.4	1.3	0.04	YES	Smoky Hill J.	Biface thinning	1/16" WS
3678-CS-10	5.7	4.1	0.5	0.01	NO	Smoky Hill J.		1/16" WS
3678-CS-3	3.8	2.7	0.6	<0.01	NO	Smoky Hill J.		1/16" WS
3678-CS-5	5.9	5.5	1.1	0.02	NO	Smoky Hill J.		1/16" WS
3678-CS-6	5.2	4.8	0.9	0.03	NO	Smoky Hill J.		1/16" WS
3678-CS-7	7.2	6.1	1.2	0.05	NO	Smoky Hill J.		1/16" WS
3678-CS-8	6.2	6.2	1.4	0.03	NO	Smoky Hill J.		1/16" WS
3678-CS-9	9.9	6.9	2.8	0.12	YES	Smoky Hill J.	burned	1/16" WS
3688-CS-2	11	3	1.9	0.09	NO	Smoky Hill J.		1/16" WS
3692-CS-1	6	3	0.6	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3692-CS-10	2	1	0.2	<0.01	NO	Smoky Hill J.		1/16" WS
3692-CS-11	2	1	0.3	<0.01	NO	Smoky Hill J.		1/16" WS
3692-CS-12	6.3	3.3	1.7	0.02	NO	Smoky Hill J.		1/16" WS

Specimen #	Length	Width	Thick	Weight	Platform	Material	Notes	Recovery
3692-CS-14	3	2.2	0.4	<0.01	NO	Smoky Hill J.		1/16" WS
3692-CS-2	5	3	1	<0.01	YES	Smoky Hill J.		1/16" WS
3692-CS-4	3	1	0.3	<0.01	NO	Smoky Hill J.		1/16" WS
3692-CS-5	3	2	0.4	<0.01	NO	Smoky Hill J.		1/16" WS
3692-CS-6	7	5	0.9	0.03	YES	Smoky Hill J.	Biface thinning	1/16" WS
3692-CS-7	4	2	0.6	<0.01	NO	Smoky Hill J.		1/16" WS
3692-CS-8	6	5	1.3	0.02	NO	Smoky Hill J.		1/16" WS
3692-CS-9	9	6	0.8	0.03	YES	Smoky Hill J.		1/16" WS
3705-CS-10	3	2	0.4	<0.01	NO	Smoky Hill J.		1/16" WS
3705-CS-11	6	4	2.3	0.04	YES	Smoky Hill J.		1/16" WS
3705-CS-2	7	6	1.6	0.05	NO	Smoky Hill J.		1/16" WS
3705-CS-3	4	2	0.6	<0.01	NO	Smoky Hill J.		1/16" WS
3705-CS-4	8	4	0.9	0.03	NO	Smoky Hill J.	Biface thinning	1/16" WS
3705-CS-5	8	4	1.1	0.02	YES	Smoky Hill J.	Biface thinning	1/16" WS
3705-CS-6	3	3	0.4	<0.01	NO	Smoky Hill J.		1/16" WS
3705-CS-7	4	3	0.4	<0.01	NO	Smoky Hill J.		1/16" WS
3705-CS-8	4	3	0.6	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3709-CS-1	7	2	0.7	0.01	NO	Smoky Hill J.		1/16" WS
3709-CS-2	7	6	0.9	0.02	No	Smoky Hill J.	Biface thinning	1/16" WS
3709-CS-3	4	4	0.9	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3709-CS-4	5	3	0.8	<0.01	NO	Smoky Hill J.		1/16" WS
3723-CS-1	5	3	1	<0.01	NO	Smoky Hill J.		1/16" WS
3768-CS-2	7	6	1.1	0.03	NO	Smoky Hill J.	Biface thinning	1/16" WS
3768-CS-3	5	4.6	0.7	0.03	NO	Smoky Hill J.	tool retouch	1/16" WS
3768-CS-4	5.4	3.7	0.5	0.02	NO	Smoky Hill J.		1/16" WS
3774-CS-1	7	6	1.7	0.05	YES	Smoky Hill J.	Biface thinning	1/16" WS
3774-CS-11	3.1	2.7	0.8	<0.01	YES	Smoky Hill J.	small retouch, strike-a-light flake?	1/16" WS
3774-CS-2	8	6	1.4	0.06	YES	Smoky Hill J.	Biface thinning	1/16" WS
3774-CS-3	5	3	0.5	<0.01	YES	Smoky Hill J.	two refit, tool retouch	1/16" WS
3774-CS-5	4	3	0.7	<0.01	NO	Smoky Hill J.		1/16" WS
3774-CS-6	6	4	0.9	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3774-CS-7	5	3	0.7	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3774-CS-8	3	3	0.5	<0.01	YES	Smoky Hill J.	small retouch, strike-a-light flake?	1/16" WS
3790-CS-1	6	6	1.1	0.02	YES	Smoky Hill J.	retouch	1/16" WS
3795-CS-1	5	3	1.1	<0.01	NO	Smoky Hill J.		1/16" WS
3795-CS-10	5	3	0.6	<0.01	YES	Smoky Hill J.		1/16" WS
3795-CS-13	11	7	1.9	0.1	YES	Smoky Hill J.	Biface thinning	1/16" WS
3795-CS-14	6	5	1.1	0.02	YES	Smoky Hill J.	Biface thinning	1/16" WS
3795-CS-15	2	2	0.5	<0.01	IN	Smoky Hill J.		1/16" WS
3795-CS-16	5	4	0.6	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3795-CS-17	7	5	0.8	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3795-CS-18	4	2	0.7	<0.01	NO	Smoky Hill J.		1/16" WS

Specimen #	Length	Width	Thick	Weight	Platform	Material	Notes	Recovery
3795-CS-19	3	3	0.6	<0.01	NO	Smoky Hill J.		1/16" WS
3795-CS-2	8	3	1.2	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3795-CS-20	4	4	0.9	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3795-CS-21	5	4	0.7	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3795-CS-22	3	2	0.3	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3795-CS-23	3	3	0.3	<0.01	NO	Smoky Hill J.		1/16" WS
3795-CS-3	5	3	0.8	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3795-CS-4	6	5	0.8	0.02	NO	Smoky Hill J.		1/16" WS
3795-CS-5	7	6	2.3	0.07	YES	Smoky Hill J.	Biface thinning	1/16" WS
3795-CS-6	6	5	1.5	0.02	NO	Smoky Hill J.		1/16" WS
3795-CS-8	5	4	0.7	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3795-CS-9	5	4	0.7	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3866-CS-1	8	6	2.1	0.07	YES	Smoky Hill J.	Biface thinning	1/16" WS
3866-CS-10	3	2	0.8	<0.01	NO	Smoky Hill J.		1/16" WS
3866-CS-11	6	4	1.3	0.03	YES	Smoky Hill J.	Biface thinning	1/16" WS
3866-CS-13	4	3	0.6	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3866-CS-2	10	5	4.2	0.11	YES	Smoky Hill J.		1/16" WS
3866-CS-3	7	4	0.7	<0.01	YES	Smoky Hill J.	Biface thinning	1/16" WS
3866-CS-4	5	4	0.8	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3866-CS-5	6	4	0.7	<0.01	YES	Smoky Hill J.	Biface thinning	1/16" WS
3866-CS-6	5	5	0.8	<0.01	YES	Smoky Hill J.	Biface thinning	1/16" WS
3866-CS-7	5	2	1.3	<0.01	NO	Smoky Hill J.		1/16" WS
3866-CS-8	6	3	0.7	<0.01	YES	Smoky Hill J.		1/16" WS
3866-CS-9	5	3	0.9	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3879-CS-1	9	6	1.5	0.06	NO	Smoky Hill J.	Biface thinning	1/16" WS
3905-CS-1	9	5	2.1	0.06	YES	Smoky Hill J.	Biface thinning	1/16" WS
3905-CS-2	8	3	0.9	0.04	NO	Smoky Hill J.		1/16" WS
3905-CS-3	3	2	0.9	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3905-CS-4	5	4	1.1	<0.01	NO	Smoky Hill J.		1/16" WS
3905-CS-5	5	4	0.9	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3905-CS-6	2.8	2.1	0.3	<0.01	NO	Smoky Hill J.		1/16" WS
3909-CS-1	6	3	0.7	<0.01	No	Smoky Hill J.		1/16" WS
3909-CS-3	7.8	3.9	1	0.04	NO	Smoky Hill J.		1/16" WS
3909-CS-5	2.7	2.5	0.4	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3909-CS-6	4.2	2.2	0.3	<0.01	NO	Smoky Hill J.		1/16" WS
3909-CS-7	7.6	7.3	1.2	0.06	YES	Smoky Hill J.	Biface thinning	1/16" WS
3909-CS-9	7.7	7	3	0.1	NO	Smoky Hill J.	burned	1/16" WS
3914-CS-1	11	7	1.7	0.08	YES	Smoky Hill J.	Biface thinning	1/16" WS
3914-CS-2	6	5	2.1	0.05	NO	Smoky Hill J.	burned	1/16" WS
3971-CS-1	6	5	1.4	0.03	YES	Smoky Hill J.	Biface thinning	1/16" WS
3971-CS-2	3	2	0.7	<0.01	NO	Smoky Hill J.		1/16" WS
4029-CS-1	7	5	2.2	0.07	NO	Smoky Hill J.		1/16" WS
4029-CS-4	5	4	1.1	<0.01	NO	Smoky Hill J.		1/16" WS
4029-CS-5	12	6	1.3	0.07	NO	Smoky Hill J.	Potlids	1/16" WS

Specimen #	Length	Width	Thick	Weight	Platform	Material	Notes	Recovery
4029-CS-6	3	2	0.8	<0.01	NO	Smoky Hill J.		1/16" WS
4029-CS-7	5	4	0.7	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
4029-CS-8	7	5	1.1	0.03	YES	Smoky Hill J.	Biface thinning	1/16" WS
4029-CS-9	3	3	0.7	<0.01	NO	Smoky Hill J.		1/16" WS
4041-CS-1	5.2	5.1	1.1	0.03	NO	Smoky Hill J.		1/16" WS
4051-CS-1	9	7	1.7	0.12	YES	Smoky Hill J.	Biface thinning	1/16" WS
4051-CS-2	9	9	2.9	0.26	NO	Smoky Hill J.		1/16" WS
4051-CS-3	7	5	1.5	0.05	NO	Smoky Hill J.		1/16" WS
4051-CS-4	4	4	1.6	<0.01	NO	Smoky Hill J.		1/16" WS
4051-CS-5	5	4	0.7	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
4051-CS-6	6	3	0.4	<0.01	NO	Smoky Hill J.		1/16" WS
4075-CS-1	12	4	1	0.04	YES	Smoky Hill J.		1/16" WS
4117-CS-1	5	4	0.9	0.02	NO	Smoky Hill J.		1/16" WS
4117-CS-2	5	5	1.1	0.01	YES	Smoky Hill J.		1/16" WS
4132-CS-1	4	3	0.6	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
4407-CS-1	7.3	3.6	1.3	0.02	NO	Smoky Hill J.		1/16" WS
4412-CS-1	7.2	4.4	2.8	0.07	NO	Smoky Hill J.		1/16" WS
4541-CS-1	4	4	0.6	<0.01	YES	Smoky Hill J.		1/16" WS
4541-CS-2	3	2	0.8	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
4541-CS-3	5	4	0.7	<0.01	YES	Smoky Hill J.	tool retouch	1/16" WS
3768-CS-7	5.1	3	0.4	<0.01	YES	SHJ?	tool retouch	1/16" WS
3774-CS-10	2	2	0.4	<0.01	NO	SHJ?		1/16" WS
3774-CS-9	4	2	0.6	<0.01	NO	SHJ?		1/16" WS
3268-CS-4	6	4	0.6	<0.01	NO	Unidentified Chalcedony		1/16" WS
3307-CS-1	5	4	0.7	<0.01	NO	Unidentified Chalcedony		1/16" WS
3445-CS-5	6	4	0.9	<0.01	YES	Unidentified Chalcedony		1/16" WS

APPENDIX

Chipped Stone Databases

Table 4: 14RP1 House 13 Quarter-Inch Water Screen Chipped Stone from 2008 Excavations.

Specimen #	Length	Width	Thick	Weight	Platform	Material	Notes	Recovery
3904-CS-5	11.6	7.8	0.9	0.08	No	Alibates?		1/4" Fill
3439-CS-1	15.6	9.9	3.7	0.44	YES	Fossil Wood		1/4" Overburden
3904-CS-3	11.9	10.8	3.3	0.46	Yes	Fossil Wood?	crushed platform	1/4" Fill
3110-CS-1	8.4	5.1	2	0.07	Yes	IN		1/4" Overburden
3160-CS-2	16.1	13.5	6.1	1.07	IN	IN	Burned, potlids	1/4" Fill
3345-CS-2	12.9	12.8	5.3	1.14	No	IN	split river pebble?	1/4" Fill
3525-CS-1	14.6	6.8	4.3	0.41	No	IN		1/4" Overburden
3722-CS-1	9.6	8.1	2.4	0.22	IN	IN	Edge utilized	1/4" Fill
4546-CS-1	12.1	8.7	2.3	0.21	NO	IN	Boone? Heated permian?	1/4" WS
3306-CS-2	11.2	11.2	2.2	0.27	No	Pennsylvanian	potlids, burned	1/4" Fill
3674-CS-3	7.3	6.8	2	0.11	No	Permian	heated	1/4" Fill
3155-CS-1	10.1	8.2	1.7	0.13	Yes	Permian	Biface thinning, burned	1/4" Fill
3170-CS-1	7.3	7	1	0.06	No	Permian	Biface thinning	1/4" Fill
3606-CS-1	9.8	8.7	2	0.16	IN	Permian		1/4" Fill
4050-CS-1	9.8	8.1	1.7	0.1	No	Permian		1/4" Fill
4186-CS-2	17.3	9.1	4.8	0.4	No	Permian		1/4" Fill
3658-CS-1	10.3	9.3	2.2	0.2	Yes	Permian?		1/4" Fill
3789-CS-3	8.6	7.3	1.6	0.09	Yes	Quartzite		1/4" Fill
3789-CS-4	9.3	8.1	2.1	0.21	IN	Quartzite		1/4" Fill
3789-CS-5	10.2	9.9	4.1	0.48	Yes	Quartzite		1/4" Fill
3194-CS-1	23.2	19	7.9	2.57	Yes	Quartzite (Bijou)		1/4" Fill
3262-CS-1	12.9	9.7	4.1	0.4	No	Quartzite (Bijou)	Tabular/radial	1/4" Fill
3345-CS-1	10.8	6.4	2.5	0.17	No	Quartzite (Bijou)		1/4" Fill
3717-CS-1	25.3	21.4	4.9	2.25	Yes	Quartzite (Bijou)	Biface thinning	1/4" Fill
3913-CS-1	10.8	6.9	1.6	0.09	Yes	Quartzite (Bijou)	Biface thinning (primary)	1/4" Fill
3310-CS-1	11.8	10	3.1	0.34	Yes	Quartzite (Bijou?)		1/4" Fill
3104-CS-1	12.5	8.8	2.3	0.26	No	Smoky Hill J.		1/4" Overburden
3104-CS-2	13.2	6.8	1.8	0.14	No	Smoke Hill J.		1/4" Overburden
3114-CS-1	6.3	2.3	1	0.02	No	Smoky Hill J.		1/4" Fill
3160-CS-1	8.3	5.8	1.5	0.06	No	Smoky Hill J.		1/4" Fill
3281-CS-1	7.5	7.2	2.2	0.09	IN	Smoky Hill J.	potlid, burned	1/4" Fill
3285-CS-1	13.6	13.1	3.9	0.63	Yes	Smoky Hill J.		1/4" Fill
3285-CS-2	10.9	6.9	1.2	0.08	No	Smoky Hill J.		1/4" Fill

Specimen #	Length	Width	Thick	Weight	Platform	Material	Notes	Recovery
3291-CS-1	7.8	6.1	1.2	0.05	Yes	Smoky Hill J.	BT/tool retouch	1/4" Fill
3306-CS-1	7	0.7	5.7	0.03	No	Smoky Hill J.		1/4" Fill
3318-CS-1	11.9	9.9	3	0.29	Yes	Smoky Hill J.	Biface thinning	1/4" Fill
3318-CS-2	12.1	6.5	1.9	0.11	Yes	Smoky Hill J.	Biface thinning	1/4" Fill
3318-CS-3	10.5	8.5	2.9	0.18	No	Smoky Hill J.		1/4" fill
3444-CS-1	8.4	8.2	1.5	0.08	No	Smoky Hill J.	near cortex, Biface thinning	1/4" Fill
3570-CS-1	14.7	8.6	3	0.32	Yes	Smoky Hill J.		1/4" Fill
3570-CS-1	10.2	9.3	2.4	0.26	No	Smoky Hill J.		1/4" Fill
3625-CS-1	13.5	11.7	2.7	0.52	No	Smoky Hill J.	Burned, potlids	1/4" Fill
3630-CS-1	9.7	8.8	3.6	0.27	Yes	Smoky Hill J.	Biface thinning	1/4" Fill
3674-CS-1	11	8.4	1.9	0.16	Yes	Smoky Hill J.	Biface thinning	1/4" Fill
3674-CS-2	19.9	9.5	4.6	0.86	No	Smoky Hill J.		1/4" Fill
3687-CS-1	8.9	7.4	2	0.13	Yes	Smoky Hill J.		1/4" Fill
3687-CS-2	10.2	8.6	3.3	0.19	No	Smoky Hill J.	Blocky	1/4" Fill
3691-CS-1	5.1	3.8	0.7	0.02	Yes	Smoky Hill J.	Tool retouch, strike-a-light?	1/4" Fill
3691-CS-2	16.7	4.8	4.1	0.4	No	Smoky Hill J.	Blocky/tabular	1/4" Fill
3767-CS-1	7.2	8.5	2.3	0.08	Yes	Smoky Hill J.	Tool retouch	1/4" Fill
3789-CS-1	10	9.1	1.8	0.19	Yes	Smoky Hill J.	Biface thinning	1/4" Fill
3789-CS-2	12	9.1	3	0.33	No	Smoky Hill J.		1/4" Fill
3794-CS-1	8.4	7.4	3.1	0.19	IN	Smoky Hill J.	Blocky/shatter	1/4" Fill
3794-CS-2	16.4	14.4	3.4	0.9	No	Smoky Hill J.	Radial? Hinge termination	1/4" Fill
3865-CS-1	14.9	9.2	2.3	0.28	No	Smoky Hill J.		1/4" Fill
3865-CS-2	10.5	7.1	2.9	0.21	No	Smoky Hill J.	Tabular/radial	1/4" Fill
3878-CS-1	9.6	6.9	1.5	0.08	Yes	Smoky Hill J.	Tool retouch	1/4" Fill
3878-CS-2	12.8	7.9	3.7	0.3	No	Smoky Hill J.	Rive gravel cortex, Split river cobble?	1/4" Fill
3904-CS-1	9.3	5.7	1.5	0.07	No	Smoky Hill J.	Tool retouch	1/4" Fill
3904-CS-2	8.1	6.6	1.5	0.07	Yes	Smoky Hill J.	Tool retouch	1/4" Fill
3908-CS-1	9.3	7.2	2.7	0.15	Yes	Smoky Hill J.	Platform crushed	1/4" Fill
3970-CS-1	20.7	9.5	2.2	0.48	No	Smoky Hill J.	Edge retouch, possibly from scraper	1/4" Fill
3970-CS-2	10.8	10.3	1.7	0.18	Yes	Smoky Hill J.	Biface thinning	1/4" Fill
4028-CS-1	16.6	9.2	1.6	0.21	Yes	Smoky Hill J.	Biface thinning	1/4" Fill
4028-CS-2	12.2	12	1.3	0.21	No	Smoky Hill J.	Biface thinning	1/4" Fill
4046-CS-1	7.4	5.9	2.4	0.09	No	Smoky Hill J.	Ear from projectile point	1/4" Fill
4074-CS-1	10.1	8.3	1.1	0.1	Yes	Smoky Hill J.	Biface thinning, burned, residue	1/4" Fill
4116-CS-1	10.1	5.6	2.1	0.06	Yes	Smoky Hill J.	Biface thinning	1/4" Fill

Specimen #	Length	Width	Thick	Weight	Platform	Material	Notes	Recovery
4186-CS-1	12.9	11.7	4.1	0.46	No	Smoky Hill J.		1/4" Fill
4205-CS-1	10.3	9.4	4	0.36	No	Smoky Hill J.	Blocky	1/4" Fill
4294-CS-1	11.6	8.5	3.5	0.25	NO	Smoky Hill J.		1/4" WS
3904-CS-4	16	15.2	4.3	0.93	Yes	Smoky Hill J.	Burned, residue adhering	1/4" Fill

APPENDIX

Chipped Stone Databases

Table 5: 14RP1 House 13 Mapped Chipped Stone from 2008 Excavations.

Specimen #	Length	Width	Thick	Weight	Platform	Material	Notes	Recovery
4519-CS-1	27.9	20.7	8	5.58	NA	Alibates	Gunflint	Piece Plot
4169-CS-1	23	19.2	7.8	3.18	NO	Fossil Wood	Radial? Unifacial retouch	Piece Plot
3717-CS-1	29.9	21	3.1	1.32	NO	IN	Burned, Potlids	Piece Plot
3217-CS-1	18.2	16.7	3.7	1.25	YES	Permian	Biface Thinning Flake	Piece Plot
3551-CS-1	17.8	16.3	3.9	0.77	NO	Quartzite	from ground stone tool?	Piece Plot
4271-CS-1	25.8	13.2	3.4	1.24	YES	Quartzite	from ground stone tool?	Piece Plot
3741-CS-1	45.6	21.4	11.3	10.31	YES	Quartzite	spall from ground stone tool	Piece Plot
4527-CS-1	23.4	19.9	4.3	1.59	NA	Smoky Hill J.	Arrow Point, side notched	Piece Plot
3958-CS-1	16.8	13.2	2.7	0.52	NO	Smoky Hill J.	Biface Thinning Flake	Piece Plot
4069-CS-1	28.7	17.4	3.5	1.71	YES	Smoky Hill J.	Blade-like flake, expanding base	Piece Plot
3355-CS-1	16.3	13.2	2.4	0.47	NO	Smoky Hill J.	Biface thinning, no platform	Piece Plot
3204-CS-1	22.9	18.7	5.1	1.57	YES	Smoky Hill J.	Biface Thinning Flake	Piece Plot
3202-CS-1	17.2	11.8	3.4	0.65	NO	Smoky Hill J.	Biface Thinning Flake	Piece Plot
3847-CS-1	52	34.3	13.8	20.15	NO	Smoky Hill J.	Biface fragment	Piece Plot
4331-CS-1	40.8	27.5	12.5	11.6	YES	Smoky Hill J.	Secondary flake, bipolar? Edge utilized?	Piece Plot
3515-CS-1	28.9	20	5	2.17	YES	Smoky Hill J.	Burned, Potlids	Piece Plot

APPENDIX

Chipped Stone Databases

Table 6: 25WT1 Chipped Stone Database.

Rec #	Spec #	Alt#	Artifact	Material	Comments	Prov.	Length	Width	Thick	Weight
71645	145		Strike-a-light flint	Alibates	strike-a-light flint	H5	56.3	26	11.7	18.5
72627	1316	A 20	Gun flint	Alibates	Gunflint	Village site	25.7	22.5	6.7	5.8
72814	1522	A 20	Gun flint	Alibates	Gunflint	Village site	26.1	17.5	5.3	2.9
71782	324		Tertiary flake	Alibates	Tertiary flake, Biface thinning	BH1, GENX	18.8	13.3	3.2	0.6
72811	1519	A 30	Tertiary flake, utilized	Alibates	Tertiary flake, utilized	Village site	38.8	30.5	7.4	10.6
	14549-1		Gun flint	Alibates	Gunflint	Metcalf Donation	27.4	22.6	7.9	5.3
	14549-3		Gun flint	Alibates	Gunflint	Metcalf Donation	23.2	21.9	4.3	2.8
	14549-7		tertiary flake, retouch, utilized	Alibates		Metcalf Donation	26.6	17.3	7.7	3.7
	14549-6		Possible strike-a-light flint	Alibates		Metcalf Donation	35.9	21.2	12	8.8
	14549-8		Possible strike-a-light flint	Alibates	rough, battered	Metcalf Donation	44.5	35.3	18.2	23.9
72636	1325	A 30	Strike-a-light flint	Alibates		Village site	36	26.4	7.5	7.4
72640	1330	A 23	Beveled knife mid-section	Alibates	cat. as A 27	Village site	24.5	21.5	7	5.2
72617	1305 (or 1306?)		Strike-a-light flint	Alibates	cat. as A24	Village site	36.5	20.8	12.8	9.8
72630	1319	A 30	strike-a-light flint	Alibates	Large, high polish	Village site	70.7	56.6	19.2	76.7
71612	112		stike-a-light flint	Alibates		H4	36.9	24.5	11.1	8.1
72642	1332	A 24	side scraper, on blade	Alibates		Village site	54.1	21.3	13	12
72638	1327	A 36	Secondary flake, retouched	Alibates	rough	Village site	57.3	26.1	13	15.7
72612	1300	A 33	Tertiary, retouched	Alibates	polish on ridges	Village site	61.6	58.4	16.8	56.5
72823	1535	A 36	side/end scraper	Alibates		Village site	28.8	21.1	7.4	4.2
71827	555		Secondary flake	Bijou Hills Green Quartzite	From chopper-scraper?	surface	68.5	59.3	26.4	69.3
72812	1520	A 20	secondary flake	Boone or Reed Springs?	Retouched, utilized, knife or scraper?	Village site	32.5	24.3	6.9	4.9

Rec #	Spec #	Alt#	Artifact	Material	Comments	Prov.	Length	Width	Thick	Weight
72637	1326	A 23	Tabular, retouched	Chalced.Ogallala		Village site	35.8	30.4	7.1	10
72839	1559	A446	Tabular fragment, retouched	Chalced., Unid.	Tabular fragment, retouched	House site	37.5	30	9.5	15.8
72634	1323	A239	Gun flint	European Brandon?	European gunflint	Village site	27.4	20.6	9.4	6.7
72639	1329	A239	Gun flint	European Brandon?	European gunflint	Village site	27.3	19.3	6.5	4.9
71763	299		Gun flint	European Brandon?	European gunflint, rust adhering	BH1, F1	26.7	19.8	8.4	6
71762	298-1		Gun flint	European Brandon?	European gunflint	BH1, F1	30.2	21.9	10.5	8.3
71762	298-2		Gun flint	European Brandon?	European gunflint	BH1, F1	27.8	22.5	7.8	6.9
71762	298-3		Gun flint	European Brandon?	European gunflint, rust adhering	BH1, F1	25.3	20.6	8.6	5.7
109854	1562	A215	Gun flint	European Brandon?	Gunflint	Village site	26.1	21.8	9	6.2
	14554		Gun flint	European Brandon?	Gunflint	Metcalf Donation	27.9	25.3	7.5	6.8
72824	1536	A 24	scraper or very thin gunflint	Flattop Chalced.		Village site	25.7	21.7	3.2	2.6
72809	1517	A 27	End-scraper	Permian	End scraper	Village site	22.4	20.6	7.7	3.8
72914	0	A 27	End-scraper	Permian		Village site	35.5	25.7	9.2	8.7
109861	0	A223	Possible gunflint fragment	Permian		Village site	20.2	16.4	4.3	2.3
71529	29		secondary flake, retouched, utilized	fossil wood (black forest?)		H2	28.4	20.2	5.7	3.6
71643	143		End scraper	Hartville Uplift Quartzite, Spanish Diggings?	Elk antler scraper insert	H5	48.2	38.8	14.9	25.8
72840	1560	A446	Knife fragment?, bifacial	White River Group?		House site	27	18.6	5.4	2.6
71781	323		Secondary flake, retouched	Obsidian		BH1, GENX	24.8	17.5	7.6	2.4
72810	1518	A 30	possible point, reworked	Ogallala chalced.		Village site	29.1	23.3	6.6	5.3
71811	485		gunflint	Penn.		surface	22.1	20.6	6.7	4.1

Rec #	Spec #	Alt#	Artifact	Material	Comments	Prov.	Length	Width	Thick	Weight
72697	1396	A 36	scraper, unifacial	Penn.	side retouch on flake	Village site	50.4	31.9	13.1	20.8
72848	1591	A 35	strike-a-light	Penn.	Reworked from large Archaic biface, hafted?	Village site	78.7	46	9.2	43.6
71745	264		arrow point, triangular unnotched fresno	Penn.?			37.9	17	3.9	2.6
73040	0	A259-2	triangular unnotched point or pipe drill	Permian	Heavily utilized, high polish, gaming piece?	Village site	27	13	5.1	2.3
	14549-4		unifacial scraper fragment	Permian, Florence		Metcalf Donation	28.1	23.9	7.2	5.5
	14547		Triangular point (fresno)	Permian, Florence A		Metcalf Donation	22.7	14.8	2.8	0.7
72631	1320	A 20	triangular flake, polished, utilized	Quartzite		Village site	42	13.1	12.5	8.5
72914	A 27-1	A 27	End scraper, Elk antler insert?	Quartzite	End scraper, Elk antler insert?	Village site	37.1	28.6	8.1	8.7
	14549-5		Tertiary flake, utilized, reworked	Quartzite		Metcalf Donation	38.6	36.2	5.2	8.6
109628	140-4		Chopper-scraper	Quartzite (bijou?)		H5	83.5	69.7	29.1	152.2
72648	1338	A524	Side scraper	Quartzite (bijou?)		Village site	78.7	52.6	18.2	82.7
72846	1566	A446	Tertiary flake, utilized or retouched	Quartzite (deep maroon)		House site	24.8	22.6	5.1	2.4
72624	1313	A 24	Gun flint	Smoky Hill J.	Gunflint	Village site	27.8	27.5	7.5	8.2
72813	1521	A 32	Gun flint	Smoky Hill J.	cat. as A 36, Gunflint	Village site	31	27	8.4	9.4
72807	1515	A 32	Gun flint	Smoky Hill J.	Gunflint	Village site	29	26	8.5	8.6
72726	1428	A 83	Biface scraper or knife	Smoky Hill J.	biface	Village site	92.1	58.3	12.9	87.1

Rec #	Spec #	Alt#	Artifact	Material	Comments	Prov.	Length	Width	Thick	Weight
72820	1530	A 24	end scraper	Smoky Hill J.	end scraper	Village site	41.5	27.9	10	14.4
72803	1511	A 26	beveled knife fragment	Smoky Hill J.	Beveled knife mid.	Village site	37.4	36.1	7.6	10.4
72644	1334	A 37	end scraper	Smoky Hill J.	end scraper	Village site	46.3	35.3	9.1	19.5
72696	1395	A 8	Tabular fragment, retouched on one end	Smoky Hill J.	Tabular fragment, retouched on one edge	House site	65.4	57.4	17.5	67.6
72737	1439	A508	Bifacial knife on tabular fragment	Smoky Hill J.	Bifacial knife on tabular fragment	Village site	124	63.6	12.6	107.2
71546	46-1		Utilized flake	Smoky Hill J.	Utilized flake	H2, C1	33.1	24.9	7.2	4.4
72600	1288	A 28	Biface scraper or knife	Smoky Hill J.	Biface scraper/ knife, high polish, dry hide process.	Village site	69.4	71.7	11.7	70.3
72620	1309	A 25	Tabular fragment	Smoky Hill J.	Tabular fragment, red from heating?	Village site	39.9	38.1	7.2	12.9
72699	1398	A443	End scraper, broken	Smoky Hill J.	End scraper, distal end broken	Village site	44.6	36.4	10.1	15.8
71640	140-1		Scraper or chopper	Smoky Hill Jasper	Scraper or chopper	H5	101.5	52.3	20.1	117.1
71782	324		Tabular fragment	Smoky Hill J.	Tabular fragment	BH1, GENX	54.7	29.3	17.1	27.7
71640	140-2		End scraper	Smoky Hill J.	End scraper, high polish	H5	66.2	62.9	13.4	55.3
71782	324-3		Tabular fragment	Smoky Hill J.	Tabular fragment	BH1, GENX	53	41.1	14.1	31
72686	1379	A446	Tertiary flake	Smoky Hill J.	Tertiary flake	House site	50.9	23	10.6	12.7
71528	28		End scraper	Smoky Hill J.	End scraper	H2	37.9	25.1	13	13.5
72623	1312	A 18	Scraper	Smoky Hill J.	Elk antler scraper insert	Village site	53.9	38.2	11.7	32.2
72615	1303	A 18	Beveled knife fragment	Smoky Hill J.	Beveled knife fragment	Village site	56.4	25.1	8.2	15.2
71779	321		End scraper	Smoky Hill J.	End scraper	BH1, GENX	37.8	26.8	9.4	11.5

Rec #	Spec #	Alt#	Artifact	Material	Comments	Prov.	Length	Width	Thick	Weight
72601	1289	A 36	Side scraper	Smoky Hill J.	Side scraper	Village site	66.3	35.3	12.3	23.1
72602	1290	A 24	End scraper	Smoky Hill J.	Elk antler scraper insert	Village site	56.8	34.5	9.8	17.6
72725	1427	A 38	Chipped Stone Hoe	Smoky Hill J.	Chipped Stone Hoe, other # AF23	Village site	164.1	76.5	19.5	233.3
72622	1311	A 18	beveled knife fragment	Smoky Hill J.	Beveled Knife Fragment	Village site	40.6	18.1	7.2	7.8
72608	1296	A 24	Biface fragment	Smoky Hill J.	Biface fragment	Village site	51.3	47.7	10.2	27.7
72817	1525	A 20	beveled knife fragment	Smoky Hill J.	Beveled knife fragment	Village site	29.8	23.5	6.4	6.7
71777	319		Projectile Point preform	Smoky Hill J.	Projectile point preform	BH1, GENX	53.2	32.2	9.6	16.3
72605	1293	A 26	Strike-a-light flint	Smoky Hill J.	Strike-a-light flint	Village site	54.3	38.4	12.3	25.1
72617	1305	A 24	Tabular biface edge fragment	Smoky Hill J.	Tabular biface edge fragment	Village site	32.8	27.2	11.5	11.3
72619	1308	A 22	Projectile Point preform, utilized as knife	Smoky Hill J.	Projectile point preform utilized as knife	Village site	61	30.6	6.5	15.9
72657	1347	A422	Scraper, highly polished, dry hide processing	Smoky Hill J.	dry hide processing, other # AS407	Village site	97.6	62.2	21.1	146.7
71573	73-1		Secondary Flake	Smoky Hill J.	Secondary Flake	H3	24.9	21.8	4.1	2.5
72621	1310	A 18	Biface fragment	Smoky Hill J.	Biface fragment	Village site	57.7	44.6	8.5	21.2
72603	1291	A 18	Unifacial end scraper	Smoky Hill J.	Unifacial end scraper on large expanding flake	Village site	73	61.9	8.6	41.7
72609	1297	A 27	End scraper, elk antler insert	Smoky Hill J.	End scraper, Elk antler insert	Village site	64.7	32.7	10.2	28.1
72913	1302	A 25	Tabular fragment, retouched	Smoky Hill J.	Tabular fragment, retouched	Village site	79.2	43.7	14.8	67.4

Rec #	Spec #	Alt#	Artifact	Material	Comments	Prov.	Length	Width	Thick	Weight
72805	1513	A 37	Utilized flake, retouched, scraper	Smoky Hill J.	Utilized flake, scraper	Village site	42	41.3	7.4	9.9
72645	1335	A443	End/side scraper, elk antler insert? Large	Smoky Hill J.	End scraper, elk antler insert? Large	Village site	78.1	65.1	14.4	63.7
73052	0	A282	Knife	Smoky Hill J.	Knife, reworked	Village site	86.4	34.9	10.6	32.3
72651	1341	A446	Knife or scraper fragment	Smoky Hill J.	Knife/ scraper	House site	48.5	36.3	5.1	8.3
70873	574		Tabular fragment, flakes removed	Smoky Hill J.	Tabular fragment, flakes removed	South terrace, south of 1941 excavation	49.1	37.3	11.3	22.4
72606	1294	A 37	Secondary flake, utilized, retouched	Smoky Hill J.	Secondary flake, utilized, retouched	Village site	53.8	33.6	11.3	19.4
72592	1269	A 33	Scraper, possible chopper	Smoky Hill J.	Scraper, possible chopper	Village site	82.1	69	17.2	114.2
72808	1516	A 27	End/side scraper	Smoky Hill J.	End/side scraper	Village site	53	14.9	8.1	8.3
72914	A 27-2	A 27	End scraper	Smoky Hill J.	End scraper	Village site	49.5	24	12.2	15
72914	A 27-3	A 27	End scraper, Elk antler insert?	Smoky Hill J.	End scraper, Elk antler insert?	Village site	48.6	21.2	8.5	10.4
	14549-2		beveled knife fragment	Smoky Hill J.	Beveled Knife Fragment	Metcalf Donation	81	40.2	11.4	42.7
72584	1257	A 32	Side scraper	Smoky Hill J.	Side scraper	Village site	82.4	57.7	15.6	99.6
72614	1295	A 7	Side scraper, utilized primary flake	Smoky Hill J.	Side scraper/ utilized primary flake	Village site	67.6	41.2	8.3	25.3
72698	1397	A443	End Scraper	Smoky Hill J.	End Scraper	Village site	50.8	26.1	10	15.2
72643	1333	A 24	End/side scraper	Smoky Hill J.		Village site	46.8	21.8	11.3	11.4
73075	0	A443	End/side scraper on tertiary flake	Smoky Hill J.		Village site	44.8	26.8	7.7	9

Rec #	Spec #	Alt#	Artifact	Material	Comments	Prov.	Length	Width	Thick	Weight
72611	1299	A 36	Secondary flake	Smoky Hill J.		Village site	63.7	23.1	9.7	9.7
72617	1305		Biface thinning tertiary, reworked	Smoky Hill J.	cat. as A24	Village site	32.3	23.6	4.5	4.3
72911	0	A 19	Large scraper or hoe	Smoky Hill J.	Other # AF3	Village site	136.7	104.9	15.8	232.5
72821	1531	A 24	Beveled knife edge fragment	Smoky Hill J.		Village site	49.5	18	7.7	8
72629	1318	A 26	Tertiary flake, modified	Smoky Hill J.	utilized, possible proximal end of end scraper	Village site	52.8	27.1	7.1	12.2
72641	1331	A 37	Side scraper	Smoky Hill J.		Village site	54.6	35	15.5	23.3
71640	140		Chopper-scraper, disc shape	Smoky Hill J.		H5	83.4	78.5	35.1	199.5
71573	73		Tabular, flake removed	Smoky Hill J.		H3	74.8	59.5	33.2	123
72804	1512	A 36	End scraper	Smoky Hill J.		Village site	46.5	32.5	8.8	14.4
72582	1254	A 28	Tabular, retouched fragment	Smoky Hill J.	used as knife or scraper	Village site	95.8	58.8	15	79.4
72841	1561	A446	end/side scraper	Smoky Hill J.		House site	26.7	20.6	3.5	2
72844	1564	A446	Unifacial, scraper or knife tip?	Smoky Hill J.		House site	19.7	14.5	3.7	1.2
72647	1337	A509	Discoidal core, utilized	Smoky Hill J.	utilized, striker, thick (possible chopper)	Village site	63	52.4	22.9	85.8
72921	0	A 43	Possible cutting edge, (three flakes removed)	Smoky Hill J.		Village site	93.3	68.2	15.8	103
72599	1287	A 17	Possible scraper or chopper	Smoky Hill J.	slight modification rough	Village site	79.5	49.2	15.8	59.6
72610	1298	A 26	Strike-a-light flint	Smoky Hill J.		Village site	49.9	31.2	10.9	18.8
72802	1510		Secondary flake, utilized	Smoky Hill J.			31.7	24.4	8	5.2

Rec #	Spec #	Alt#	Artifact	Material	Comments	Prov.	Length	Width	Thick	Weight
72668	1360	A443	tertiary flake	Smoky Hill J.	Retouched, utilized	Village site	43.3	39	10.9	15
72689	1384	A446	strike-a-light flint?	Smoky Hill J.	possible large gun flint??	House site	48.1	32.9	11.8	20.7
72681	1374	A446	strike-a-light flint	Smoky Hill J.	Possible gun flint	House site	45.9	28.5	8.4	11.5
71808	482		tabular, possible radial flake	Smoky Hill J.	one end battered, chalky cortex	Area 2, F3	58.3	36.5	14.5	28
109588	46		secondary, modified	Smoky Hill J.	utilized	H2, C1	48	22.7	6.4	6.8
72604	1292	A 17	bipolar split pebble	Smoky Hill J.	Modified, utilized	Village site	53.9	39.1	12.9	20.9
72918	0	A 34	Arrow Point, side notched	Smoky Hill J.	Late Woodland?	Village site	62.2	20.7	6.2	7.2
72845	1565	A446	Arrow Point base, side notched	Smoky Hill J.		House site	18.4	11.1	3.8	0.9
72822	1533	A 26	Beveled knife	Smoky Hill J.	midsection	Village site	33.4	25.6	8.3	8.8
73040	0	A259-1	triangular unnotched point or pipe drill	Smoky Hill J.	Heavily utilized, high polish, gaming piece?	Village site	30	15.3	5.5	2.4
72728	1430	A523	Biface, polished	Smoky Hill J. chalky white	Biface, polished	Village site	222	101.3	33.6	772
72916	0	A 31	Arrow Point, Scallorn	Smoky Hill Jasper? Green, dendritic		Village site	24.8	17.6	3.7	1.3
72818	1527	A 30	Secondary flake, retouched	Unid.	cat. as A 23	Village site	29.1	26.2	15.8	7.5
72806	1514	A 32	Distal end of blade	Unid.	Retouched, patina, old?	Village site	28.1	18.6	7.4	3.7
72637	1326	A 23	possible strike-a-light flint	Unid. Chalced.		Village site	36.2	30.6	7.1	9.9
71846	495		Gun flint	WRG		surface	24.5	22.7	8.5	5.9
72656	1346	A446	End scraper	WRG?		House site	42.8	27.9	16.2	16.1

Rec #	Spec #	Alt#	Artifact	Material	Comments	Prov.	Length	Width	Thick	Weight
72635	1324	A 37	End scraper	WRG?		Village site	40.9	35.7	16.1	27.1